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SUMMARY OF RECENT ABSTRACTS*

VI. PLAGUE

General

In a series of articles, which will eventually be published as a WHO Monograph, POLLITZER (pp. 388, 616, 690, 857) has prepared a full summary of the history of plague, and a survey of its present distribution. He (p. 616) sums up work on *Pasteurella pestis* in relation to morphology, cultural characteristics, biochemical properties and vital resistance, and (p. 690) the literature on the immunology of plague, dealing with virulence, toxins, antigenic structure, vaccines, sera and diagnostic tests. He concludes that good laboratory results can be obtained with killed and live vaccines, but in this article he does not discuss their relative merits in human plague. He has also (p. 857) summarized the literature on the pathology of plague, including work on experimental animals and on man. There is no real dividing line between bubonic and septicaemic plague, and he suggests a classification into (1) bubonic (including septicaemic and secondary pneumonic) and (2) primary pneumonic. In comment Megaw objects that there may be septicaemia without buboes, and suggests a classification which differentiates plague transmitted from animals to man (zootic), usually by fleas, and plague transmitted from man to man (demic), usually by inhalation.

Two opinions given by Pollitzer, on the supposed absence of rats from Europe before the 12th century, and on the interpretation of biblical plague respectively, are opposed by MACARTHUR (p. 388), who produces evidence that rats were present in Europe long before the 12th century, and that biblical plague cannot be identified with dysentery and piles. He (p. 1111) refers to the finding of a skeleton of a rat in a neolithic site on Mount Carmel, Israel, as evidence that rats have, in fact, been present there from very ancient times.

Epidemiology: Animal Hosts

A report on foci of plague in Kurdistan has been contributed by BALTAZARD *et al.* (p. 1041), who state that in that region domestic rodents are not

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1952, v. 49. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

found, and the infection is present mostly in *Meriones* species, and occasionally in other field rodents. *Meriones*, however, are relatively resistant to the infection, but serve as reservoirs. One outbreak in man began with a boy who had septicaemic plague after playing in an isolated mill, near which infected *Meriones* were found.

In South Africa plague is now almost entirely of sylvatic type. Schulz (p. 389) shows that the most important reservoirs are gerbils, which are entirely rural in habit, and multimammate mice, which occasionally burrow in human dwellings and serve as links between gerbils and man. Rodent plague in South Africa occurs very close to Johannesburg, and human cases are found from time to time. Innes (p. 1111) shows that control is exercised in the shanty towns by vigorous use of dust containing 10 per cent. DDT and 5 per cent. BHC, or of a 50 per cent. BHC fog.

Simon (p. 140) has studied the susceptibility to plague of rodents in Brazil, in a monograph which cannot satisfactorily be summarized.

Link (p. 389) states that the last instance of plague among rats in ships occurred in 1938.

Transmission

Double infection with *Salmonella* spp. and *P. pestis* has been induced experimentally in fleas by Eskey *et al.* (p. 265). Some of these fleas could transmit one or the other infection, or both, by bite, but blockage of the stomach was found to have occurred in all the doubly infected fleas which transmitted plague.

A series of experiments on the reaction of *Xenopsylla cheopis* to conditions of varying humidity is reported by Smith (p. 390). Details should be sought in the original. In experimental work Holdenried (p. 769) has shown that *X. cheopis* is easily infected and is an excellent transmitter of plague, though some individual fleas do not become infected. *Polygenis gwyni*, the flea of the cotton rat, is almost as good a vector, but *Diamanus montanus* from the ground squirrel gave negative results in these experiments. He (p. 1113) has examined the alimentary and reproductive tracts of fleas infected with plague bacilli. He notes the vigorous use of the pharyngeal pump, and the telescoping action of the abdomen, in blocked fleas.

Boiron (p. 616) shows that in Dakar the common domestic flea at one time was *Synosternus pallidus*, but that in recent years it has almost disappeared, and *Pulex irritans* has increased in both rat and domestic collections.

A survey of ectoparasites on *Rattus norvegicus* in a village of Rhode Island is reported by Knutson and Szymkowicz (p. 857).

A high proportion (93·5 per cent.) of fleas caught on *Rattus r. alexandrinus* in a Japanese steel works were *X. cheopis*; Harada *et al.* (p. 139) show that this is a very unusual finding in Japan.

Treatment

Prompt response to streptomycin with sulphadiazine is reported by Fain *et al.* (p. 389) in pneumonic and septicaemic plague, and to streptomycin in plague meningitis. Rao (p. 769) treated 407 cases of plague with sulphonamide alone or with streptomycin. There was only 1 death in 155 patients who had previously received inoculation against plague, but there were 14 deaths in 222 uninoculated persons (the inoculation history of 30 was not known). The death rate in those who received sulphonamide alone was 3·3 per cent., and in those who received sulphonamide and streptomycin it

was 3·8 per cent.; but the author feels that the combined treatment gave better results, especially in patients unconscious on admission.

Ramachandran (p. 618) treated 15 cases of plague with aureomycin; 3 of these patients were very ill and died within a few hours, but the remainder were cured.

Mercier (p. 1042) used chloramphenicol in two cases of pneumonic plague. The effect could not be estimated in one, but seemed to be beneficial in the other.

Aetiology: Immunology

Amies (p. 1112) discusses the difficulty in preserving rodents sent for examination. He avoids putrefaction by placing the animal in a jar containing 2–3 ounces of common salt and screwing the cap down tight. Cultures are best made from the marrow of the femur.

Girard (p. 617) strongly recommends the examination of serous fluid obtained by post-mortem puncture of liver, lungs and buboes, for detecting plague. Smears are made and the material can be inoculated into guinea-pigs by rubbing into shaven and excoriated skin.

Hills and Spurr (p. 509) have studied the effect of temperature on the nutritional requirements of *P. pestis*: the complicated details should be sought in the original. Englesberg (p. 947) discusses the nitrogen and sulphur requirements of *P. pestis*.

Rockenmacher *et al.* (p. 1112) describe a chemically defined culture medium in which the amino-acid composition resembles that of casein, and which can be used in fluid or solid form (with agar). For the solid medium haematin or blood must be added, or incubation must be carried out at greatly reduced atmospheric pressure.

Devignat (p. 45) differentiates 3 varieties of *P. pestis* according to ability to ferment glycerin and to produce nitrous acid:—

		glycerin fermentation	*nitrous acid production*
I.	*P. pestis orientalis*	−	+
II.	*P. p. antiqua*	+	+
III.	*P. p. mediaevalis*	+	−

He thinks that variety I came from India, Burma and S. China, variety II from Central Asia (and caused the Justinian pandemic), and that variety III probably arose from II, causing the Black Death, and that it still persists in south-east Russia, Mongolia and Manchuria. The argument should be followed in the original.

Gunnison *et al.* (p. 45) differentiate *P. pestis* and *P. pseudotuberculosis* by means of a bacteriophage, and describe their technique.

Seal (p. 138) has grown *P. pestis* in his own casein hydrolysate broth medium, and by differential precipitation with increasing strengths of sodium sulphate has separated 5 fractions from the filtrate, and also from water-soluble extracts of cultures of virulent *P. pestis* grown on his casein hydrolysate agar medium. The fraction from one-third saturation was serologically the most active, and was regarded as the specific antigen of virulent strains; others were probably non-specific antigens common to all plague bacilli and to *P. pseudotuberculosis*. He (p. 139) isolated an active specific polysaccharide from the specific soluble proteins, and from the supernatant fluid. He thinks that the protective substance is a polysaccharide-protein complex, probably a nucleoprotein.

Larson *et al.* (p. 265) have been able to demonstrate specific, soluble, heat-labile antigens of *P. pestis*, or of organs of animals which have died of

plague, by means of a precipitin test with anti-plague serum. False positive reactions can be avoided by absorption of the serum with *P. pseudotuberculosis*, *P. multocida* and *Br. tularensis*.

Baker *et al.* (p. 616) have isolated 2 antigenic fractions from the water-soluble portion of *P. pestis*; one (IA) is precipitated by ammonium sulphate and contains carbohydrate as well as protein, and the other (IB) is obtained by purification of the first and is free from carbohydrate. They have similar immunizing properties, good for mice and rats, poor for guineapigs. In addition the water-soluble extract contains a toxic substance. The water-soluble residue contains antigenic substances which produce a relatively high degree of immunity in guineapigs. The authors refer to the fractions described by Seal (above); further study is needed. With one of the fractions described in the preceding paper [presumably IB] Chen *et al.* (p. 617) have devised a complement-fixation test, and have used a specific high-titre anti-plague serum as the standard antibody. The test is useful in retrospective diagnosis, and with it the authors have demonstrated the high immunizing power of the vaccine produced at the Haffkine Institute in India. In further work on this subject Silverman *et al.* (p. 1043) showed that fraction IA is a potent immunizing agent, and that it contains a carbohydrate which is probably serologically active, possibly in a manner similar to that of the pneumococcus polysaccharide.

Control

X. cheopis is an important vector of disease, and development of resistance to DDT would be a serious matter. By exposing successive generations to DDT for 4 minutes each, Kilpatrick and Fay (p. 941) reduced the mortality rate from 65 to 37 per cent., but no further on successive exposures even of 8 minutes. They admit that selection under laboratory conditions does not compare with selection in the field, and they cannot predict the latter.

After a considerable experience in villages of Bombay State, Patel and Rodda (p. 1113) found that DDT watery spray or oil solution (65–75 mgm. per square foot) applied to houses was very potent in reducing the incidence of plague, and the flea index. Additional dusting of rat burrows with 10 per cent. DDT powder was carried out in some places. They think that rat destruction is not necessary in such circumstances. DDT powder has been used since 1947 in Tananarive (Madagascar) for plague control, and Mercier (p. 1044) shows that the *X. cheopis* index has fallen from 3·51 in 1948 to 0·05 in 1951. Since 1947 no abnormal mortality has been observed in rats. The powder used contains 5–10 per cent. of both DDT and BHC, and the dusting operation is done every 6 months, along with DDT spray for malaria control.

van Someren (p. 770) shows that BHC may be lethal to rats if scattered on to a floor with which they are in contact for 12–60 hours, or on damp soil over which they must run each day. Bait containing 1 per cent. BHC is also generally lethal. The gamma isomer is probably the toxic fraction.

By using Warfarin in rolled oats as a poison bait Gross *et al.* in Hawaii (p. 509) obtained a great reduction in *R. alexandrinus*, *R. rattus* (but this was not a common rat there), *R. norvegicus* and *Mus musculus* in a test area of 78 acres of mature sugar cane. *R. hawaiiensis* was not affected, presumably because it did not eat the bait, but Bonnet *et al.* (p. 510) produce evidence which suggests that *R. hawaiiensis* is more resistant to Warfarin than the other species. Favorite (p. 948) has used Warfarin on Okinawa, with success against *R. flavipectus* and *R.*

norvegicus. He suggests that it might be specially useful after a quick-acting poison such as 1080 has been used.

Another coumarin preparation known as Tomorin has been used with success against *R. rattus*. Bervoets and Damm (p. 948) state that it satisfies almost the ideal conditions required of a chemical rodenticide. Reynes (p. 1043) shows that Tomorin is very satisfactory as a rat poison, even after short exposures. The powder adheres to the hairs of the rats and is swallowed when they make their toilet; in particular it adheres to the long hairs of *R. norvegicus*. *Charles Wilcocks*

MALARIA

Romeo, V. Il problema malarico. [**The Malaria Problem**] *Riv. di Malariologia*. 1952, Dec., v. 31, Nos. 4/6, 163–7. English summary (7 lines).

This paper comments on some of the results achieved during 5 years' endeavour to control malaria by the systematic use of residual insecticide spraying in the Province of Reggio Calabria. Endemic malaria in this Province is of particular interest and has received much attention from malariologists in the past. On the side of the Province facing the Tyrrhenian Sea the sole vector is *Anopheles maculipennis labranchiae*; on the side facing the Ionian Sea the sole vector is almost always *A. superpictus*.

There has been a steady decline in the number of cases of malaria reported. Many people suffer from malaria without having recourse to the doctor, and doctors sometimes fail to report cases, but despite these sources of error there is no doubt as to the diminishing incidence of malaria. Larvae and adults of the two vector species of *Anopheles* can still be found in considerable numbers however. A condition of anophelism without malaria seems to have arisen in places. Adult anophelines are most often found in uninhabited houses in treated areas, or in cellars or underground passages that have been overlooked in treated houses. An interesting fact is that the insects captured are very short-lived in the laboratory. When the work began it was possible to keep them alive for several weeks; now they rarely, if ever, survive more than 24 hours. In the captures of adult mosquitoes the number of males is excessive, often equal to or greater than the number of females.

Despite the marked decline in malaria incidence it is necessary to continue malaria control measures, including the treatment of the infected, and antilarval measures. *Norman White*

Auffret, H. & Reynier, C. Paludisme et bouton d'Orient à Mograr Tahtani (Sud Oranais). [**Malaria and Oriental Sore in Mograr Tahtani, Southern Oran**] *Arch. Inst. Pasteur d'Algérie*. 1952, Dec., v. 30, No. 4, 382–92, 2 figs. [13 refs.]

Mograr Tahtani is a *ksar* (fortified place) that lies 56 kilometres south-east of Aïn Sefra in southern Oran. It was built in very ancient times on the left bank of the Mograr river bed, some 7 kilometres to the east of the Colomb Bechar to Aïn Sefra road and of the Oran to Colomb-Bechar railway. A palm grove of some 6,500 trees extends for 3 to 4 kilometres along both banks of the *oued*. Mograr Tahtani lies to the east of this palm grove.

Lying off the beaten track this rather mean little village has been neglected. The Berber population numbers 480, of whom 125 are children below the age of 15. They are very poor: garden and palm tree products and a few goats, sheep and asses are their only possessions. There is neither commerce nor industry. There is no primary school: the children receive religious instruction in a koranic school. A doctor from Aïn Sefra visited the village monthly, when the first epidemiological survey of the place was carried out in 1951. The results of this survey are recorded in this interesting paper.

All the children were examined; 54·3 per cent. of them had an enlarged spleen. The malaria parasite rate was 33·8 per cent. Of 23 positive blood films in which the species was determined 13 contained *P. falciparum*, 5 *P. vivax* and 5 *P. malariae*. Finding endemic *P. malariae* infections so far north is of interest.

Larvae of *Anopheles hispaniola* [*turkhudi*] were found in June and July in residual water in 2 or 3 places in the dried river bed near the village.

Two children who had never been outside Mograr Tahtani were found suffering from cutaneous leishmaniasis. This condition had not been recorded there before. *Norman White*

Bruce-Chwatt, L. J. **Malaria in African Infants and Children in Southern Nigeria.** *Ann. Trop. Med. & Parasit.* 1952, Sept., v. 46, No. 2, 173–200, 7 graphs. [63 refs.]

During 1948–50 the author in the Lagos area investigated the incidence and degree of malarial infection in 551 parturient women and their new-born babies. Blood slides were taken from a deeply placed central portion of the maternal placenta, and from the mother and the new-born baby, the latter within 6–24 hours of delivery. The weight of all new-born infants was recorded and whenever possible their progress was followed throughout the neonatal period.

Of the women, 27·4 per cent. were found to be infected, and the slides obtained from the placentas showed malaria parasites in 22·3 per cent. There were, however, no cases of congenital malaria among the children born of these women. Those in whom no evidence of infection was found in the placenta gave birth to slightly heavier babies than those who were infected. Neonatal mortality among the offspring of the latter was not significantly increased.

The follow-up study showed that the parasite rate among infants in the age-group 1–3 months was significantly lower than those during the remaining months of the first year of life. The weight curves of both infected and non-infected infants flattened out at or about the age of 5 months but this flattening was more pronounced in the infected than in the non-infected group. Primary untreated malaria brought about considerable reduction in weight in 15 per cent. of infants, the effect was transitory in 50 per cent., and there was little or no effect in 18 per cent. The last finding and the low parasite rates found in the first 3 months of life are taken as indirect evidence of the existence of an inherited transient passive immunity against malaria.

From the records of 3,540 autopsies performed upon children in Lagos during the years 1933–50 it is deduced that malaria can be incriminated as the cause of death in 9 per cent. of infants, in 14 per cent. of children aged 1–4 years, in 9 per cent. of children aged 5–7 years, in 4 per cent. of older children and in 2 per cent. of adolescents. It is further estimated that

35,000 children under the age of 15 years die of malaria annually in Nigeria, and that malaria mortality per 1,000 of Africans exposed to risk is: infants 12·5, young children 7, older children 1, adolescents and adults 0·3. [These figures are interesting though they cannot be regarded as proved beyond doubt.] There is a full and very lengthy discussion of the part played by malaria "in the reproductive wastage of the indigenous population of tropical Africa" and a review of the literature with which readers of this *Bulletin* will be familiar. *A. W. Woodruff*

Adler, S. & Zuckerman, A. **Observations on the Morphology of a Strain of *Plasmodium ovale*.** *Ann. Trop. Med. & Parasit.* 1952, Dec., v. 46, No. 4, 289–97, 1 text fig. & 24 coloured figs. on pl. [18 refs.]

A detailed description is given of a parasite, originally found by Gurevitch and Laufer [this *Bulletin*, 1953, v. 50, 277] in the blood of a splenectomized patient from Iraq. The chief morphological details are as follows: solid, non-amoeboid trophozoites—often several in a single erythrocyte, early appearance of Schüffner's dots together with an acidophilic substance in scrolls and loops probably extruded from the nucleus and sometimes forming a "capsule" around the parasite, mature schizonts occupying only two-thirds of the erythrocyte and containing 8–20 merozoites, and very sparse pigment. The infected red cells were deficient in haemoglobin, and less than 6 per cent. were oval in shape. The patient's blood showed anisocytosis and also contained *P. vivax*.

The authors conclude that the infection was *P. ovale*, the abnormalities in morphology possibly being due to the effects of splenectomy, or to a special variety of the parasite, but wisely state that the problem can only be settled by examining more material and obtaining the sporogonic stages in mosquitoes. [Unusual forms of *P. vivax* are not uncommon, particularly in anaemic blood; splenectomy results in a "florid" development of most plasmodia—for these reasons the reviewer would hesitate to accept with certainty the identification of this parasite in an area outside Africa, where, as the authors indicate, the presence of typical *P. ovale* has yet to be demonstrated.] *P. C. C. Garnham*

Rioux, J. A. Extension de l'aire de répartition d'*Anopheles hyrcanus* Pallas 1771 en Camargue. [**Extension of the Area of Distribution of *Anopheles hyrcanus* in the Camargue Region**] *Ann. Parasit. Humaine et Comparée.* 1953, v. 28, Nos. 1/2, 127–8, 1 map.

In 1941, Treillard found *Anopheles hyrcanus* 15 kilometres south-east of Arles [this *Bulletin*, 1943, v. 40, 667]. The present author has recently found it in an area from the Salins-de-Giraud to Sambuc, to the west of the Grand-Rhône area, much nearer to the Camargue region. Multiple bites immediately above the ankle were frequent.

Frizzi, G. Genetica di popolazioni in *Anopheles maculipennis*. Studi preliminari sui riordinamenti cromosomici del gruppo. [**Genetics of Populations of *Anopheles maculipennis*. Preliminary Studies on Chromosome Patterns in the Group**] *Ric. Sci.* Rome. 1949, v. 19, No. 6, 544–52, 3 figs. [17 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1953, Feb., v. 41, Pt. 2, 30.]

The results are given of a study of the patterns of salivary-gland chromosomes of larvae reared from eggs laid by females of *Anopheles maculipennis* Mg. vars. *typicus*, *atroparvus* van Thiel, *labranchiae* Flni., *messeae* Flni.,

and *sacharovi* Favr (*elutus* Edw.) from various parts of Italy and of larvae that resulted from crossing *atroparvus* with *labranchiae* and *typicus*. It is concluded that although the data do not permit the differentiation of the varieties on this basis, they show that hybridization between them does not occur in nature.

See also p. 655, Stage, Gjullin and Yates, **Mosquitoes of the Northwestern States.**

Young, M. D. & Burgess, R. W. **Susceptibility of** *Anopheles quadrimaculatus* **to Korean Vivax Malaria.** *Pub. Health Rep.* Wash. 1952, Jan., v. 67, No. 1, 14–16.

For 14 months preceding August, 1951, 6,642 cases of malaria were reported to have occurred in the U.S.A. among troops back from Korea. The men had been on suppressive chloroquine (0·3 gm. of the base per week) but occasional doses were missed; it was thought that most of the cases were relapses of *Plasmodium vivax*, which showed a pattern different from that of the South Pacific strain. The common American vector—*Anopheles quadrimaculatus*—was allowed to bite 53 of the patients, and 35 (66 per cent.) of these patients proved infective to the mosquitoes, some of which became heavily infected. The danger of this situation to the public health is emphasized. *P. C. C. Garnham*

Senior White, R. A. **Studies on the Bionomics of** *Anopheles aquasalis* **Curry, 1932. Part I.** *Indian J. Malariology.* 1951, Sept., v. 5, No. 3, 293–403, chart 1 (folding). [55 refs.] **Part II.** *Ibid.*, Dec., No. 4, 465–512, charts 2–3. [24 refs.] **Part III.** *Ibid.*, 1952, Mar., v. 6, No. 1, 29–72, chart 4. [23 refs.]

This vast paper is the outcome of several years' study of the problem of malaria transmission in Trinidad. As the author remarks, it will also be of interest to students of other branches of animal ecology, in respect of the methods used, and the statistical treatment of the results. [A slight criticism might be made on one point, and that is the complete absence of maps and illustrations of any kind. A simple sketch map would have helped immensely, as would even a very few photographs, while some, at least, of the detailed results contained in the 55 tables might perhaps have been deposited in an appropriate institution without decreasing the value of the paper as a whole.] On the credit side, the sound and lucid statistical analyses must be mentioned. The paper is presented in 9 sections, and the results may be summarized as follows:

Section I. The systematic position and geographical distribution of the species are discussed. As the species *aquasalis* was only distinguished from the rest of the *tarsimaculatus* complex in 1932, much of the earlier work is difficult to interpret. A detailed review of previous findings, particularly those of Deane, Causey and Deane [this *Bulletin*, 1949, v. 46, 319] is given. The distribution of the species of the *tarsimaculatus* group, and the records of dissections of *A. aquasalis*, are summarized from the literature in Tables I and II, respectively, of the present paper. The result shown is that *A. aquasalis* is a fair vector from 23°S. to the Equator, either not at all, or a very feeble vector from the Equator to 10°N. (including Trinidad),

and a potent vector in the Windward Islands, still further north. Nothing is known of its vectorial capacity at its northern limit of 17°N.

Section II. A statistical study of geographical variation within the species, based on the maxillary indices, shows that 5 groups (" demes ") can be distinguished, falling into 2 separate clines, which may merit sub-specific status. The Trinidad deme is shared with British Guiana, but is replaced by a different one, of very restricted range, on the ancient land mass of Central Tobago.

Section III. The distribution of *A. aquasalis* in Trinidad shows a decrease in density, with increase in distance from the sea.

Section IV. Egg counts in the ovaries showed a significant decrease in July and October, and a significant increase in November and December. The reason for this is not known. The larvae tolerate salinity up to 68 per cent. sea water, but during the rains most of the breeding is in 10 per cent. or less, rising to 30 per cent. in the dry season. Pupation is favoured by rather higher salinities than appeared to be the larval optimum. Shade and turbidity are unfavourable to breeding, but the concentration of saline ammonia, below the limit of 10 mgm. per litre, was not correlated with the extent of breeding.

Section V. The length of the life cycle was studied both in the laboratory and in the field. The frequency of peaks of larval production in the field indicated an average developmental period of 8¼ days, and a complete generation in 12 days.

Section VI. Five types of breeding places were subjected to extended surveys, which are described in detail. Second growth mangrove, particularly *Rhizophora*, is more productive than virgin areas in other countries. *Ruppia maritima* affords a good nidus for the larvae of *A. aquasalis*, and *Cyperus articulatus* was found to be the most productive of 3 species of salt-tolerant reeds. Neither rice nor watercress cultivation was a serious source of breeding. In the former, there were appreciable numbers of *A. aquasalis* only in the first 3 months of the crop season. Breeding was found in a stream descending from the Northern Range (the Maracas) only during the dry months of the year. The mosquito population of a bamboo plantation (the Nelson Bamboos) in which neither breeding nor feeding occurred, was studied.

Section VII. Adult activity, though mainly crepuscular, was shown to continue throughout the night. The proportion of the night's total catch appearing before 20.30 hours was significantly increased by moonlight. The majority of adult *A. aquasalis* rest out of doors during the day. The usual traps failed to attract any of this resting population, but the resting place was eventually located in low scrub and grass. Removal of scrub and trimming of grass were inimical to resting, but might encourage house resting habits. Evening activation of resting *A. aquasalis* was shown to be a reaction to change of light intensity, and to consist of a movement upwards from the low vegetation, and then a flight outwards from the shade. A study of the proportion of late-digestion stages in the population revealed a mortality of about 95 per cent. in each gonotrophic cycle. Studies on swarming and mating have been begun. The swarms of males contain only a few females, and do not appear to be the site of mating. The results of a long series of ovarial and spermathecal dissections are reported. Relict eggs were found in the ovaries mostly at the beginning and end of the period of maximum production. Fluctuations in density were found to occur at a shorter interval than the length of the gonotrophic cycle, and this is shown to be due to a high proportion of specimens requiring more than one blood

meal during each cycle. Long period fluctuations of climatic origin are discussed. The maximum density, with local and annual variations, occurs between the end of May and early September. Infiltration of the population of *A. aquasalis* into the northern valleys from the plain did not occur, contrary to previous belief.

Section VIII. Blood preferences were studied from precipitin reactions on wild-caught specimens, and are dealt with in some detail. It is shown that oxen and horses are preferred to man, and man is only seriously attacked where those animals are sparse or absent. Other domestic animals are not favoured hosts. A large proportion of feeds are shown to be multiple on more than one species of host. These tendencies were found to fluctuate significantly in a single area over the year, but these fluctuations were not related to any known factor, and are not yet fully understood. Feeding on flower nectar by both sexes was studied. Sugar could be detected in the mosquitoes by chromatographic analysis, but, as the author admits in a footnote, it might be derived from glycogen stored by the larval stage.

Section IX. The dissection data from Trinidad are discussed in detail, and it is calculated that extremely large numbers (about 9 million) of female *A. aquasalis* would be needed to produce one human infection. This is modified, however, by the large amount of multiple feeding in this species, and it is also shown that populations of this magnitude are likely to exist. The final table (Table LV) is an interesting comparison of the vectorial capacities of *A. gambiae*, *A. fluviatilis*, *A. darlingi*, and *A. aquasalis*.

A. J. P. Goodchild

Crosnier, Giraud, Darbon & Parvais. Rupture spontanée d'une rate palustre. Splénectomie. Guérison. Image giganto-folliculaire de la pulpe splénique. [**Spontaneous Rupture of a Malarial Spleen. Cure after Splenectomy. Hyperplasia of Follicles in the Splenic Pulp**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1953, Nos. 5/6, 127–31.

The rupture occurred in a non-commissioned officer who had several attacks of malaria since his return from Indo-China.

Perrini, F. Considerazioni sulla scomparsa della malaria in Italia. [**Diminishing Malaria Prevalence in Italy**] *Riv. di Malariologia.* 1952, Dec., v. 31, Nos. 4/6, 169–73, 1 chart. English summary (3 lines).

Reference is made to the post-war extension of malaria in many parts of Italy and the extension of the disease to areas that had previously been immune. A brief description is given of the success that attended the 5-year plan, 1947–51, of the large amounts of residual insecticides used in carrying out that plan, and the cost of the enterprise. There is good reason to hope that the near future will see Italy completely free from malaria.

Norman White

Jerace, F. Dopo trent'anni di lotta antimalarica nell'Agro Romano. [**Thirty Years of Anti-Malaria Effort in the Agro Romano**] *Riv. di Malariologia.* 1952, Dec., v. 31, Nos. 4/6, 145–51, 5 figs. & 1 chart. English summary (4 lines).

In a previous publication the author related the story of malaria in the Agro Romano during 1943–47, which period witnessed the severe epidemic which resulted from the war upheaval: the promising results obtained by the use of DDT residual spraying were also described [this *Bulletin*, 1949, v. 46, 427]. He now gives an outline of events during the ensuing 5 years, up to

the end of 1951, and briefly describes the fluctuations in malaria prevalence in the Agro Romano during the last 30 years, relating them to the methods of malaria control employed during that period. He dips further back into history and reminds the reader that this area had been desolated by malaria for at least 2,000 years.

Each year, in the pre-epidemic period, all dwellings throughout the area are systematically sprayed with a residual insecticide (DDT, chlordane, methoxychlor, etc.). In 1949 there were only 16 cases of malaria notified and not one of these was a primary indigenous infection. In that year the parasite index of 5,000 individuals of various age groups was zero. During the 3 years 1950–52 not a single case of malaria was reported. A few anopheline larvae and an occasional adult anopheline are still to be found, but malaria infection exists no more in the Agro Romano, an event of historic importance. *Norman White*

DE MEIRA, M. T. V. A campanha de erradicação de culicídeos na Ilha do Sal (Cabo Verde) (Dezembro de 1948 a Dezembro de 1950). [**Campaign for the Eradication of Mosquitoes in the Island of Sal, Cape Verde Islands, from December 1948 to December 1950**] *Anais Inst. Med. Trop.* Lisbon. 1952, Mar., v. 9, No. 1, 43–125, 4 maps [2 on 2 pls. (1 folding)] & 40 figs. [12 refs.] English summary.

Sal is the north-easternmost of the islands of the Cape Verde Archipelago. It measures only 216 square kilometres, 30 kilometres from north to south with a maximum width of 12 kilometres. It has a population of 2,700. It assumed a new importance in May, 1949, when an international air-port began to function on the island, a port of call for aircraft flying between Europe and South America.

The island is almost entirely flat and low-lying. It has no permanent water courses and natural collections of water are but few. The rainfall is scanty and irregular; the mean rainfall for 1927–40 was but 117·7 mm.

Three species of mosquitoes were found on the island, *Anopheles gambiae*, *Aëdes aegypti* and *Aëdes caspius*. *A. gambiae* was confined to a very small area in the south of the island: endemic malaria infections did occur but they were very few in number. *Aëdes aegypti* was somewhat more widespread: the last case of yellow fever that occurred was in 1873 when there was a severe epidemic. The harmless *Aëdes caspius* was the most prevalent species.

All dwellings and animal houses were sprayed with a DDT emulsion, 2 gm. per square metre. Since March, 1949, neither *A. gambiae* nor *Aëdes aegypti*, in any developmental form, has been found on the island. Two further sprayings were carried out, one with DDT and BHC and one with chlordane. This was done to study the effect of the spray on other insects, chiefly the house-fly. Antilarval measures, including the use of *Gambusia*, were successful in eliminating *Aëdes caspius*: none has been seen since April, 1950. *Norman White*

CORRADETTI, A. Études de Pathologie et d'Immunologie comparées dans le paludisme de l'homme et des animaux. [**Studies in Comparative Pathology and Immunity in Human and Animal Malaria**] *Riv. di Malariologia*. 1952, Dec., v. 31, Nos. 4/6, 129–34.

The author first points out that the site of schizogony in the Haemosporidiidea varies from species to species, and that 6 varieties may be

recognized (*Haemoproteus*, *P. elongatum*, *P. gallinaceum*, reptilian malaria, *H. kochi*, and *P. cynomolgi*); he then goes on to show that the immunity reactions in their hosts are also different. In *Plasmodium elongatum* there is phagocytosis of the entire parasite with an absence of crisis phenomenon, in *P. cynomolgi* (and *P. vivax*) there is the same type of phagocytosis in the presence of typical crises, while in *P. gallinaceum* (and *cathemerium*, *relictum* and *Haemoproteus*) there is phagocytosis of pigment only, though crises in parasitaemia typically occur (except in *Haemoproteus*). In *P. berghei* malaria of rats, the infection disappears between the 12th and 50th days after the primary attack—inoculation of blood is always negative and splenectomy is incapable of provoking a relapse—in other words, the parasite has truly disappeared. But immunity persists (up to at least 205 days) because such animals cannot be superinfected with the homologous strain of parasite; this is a true immunity and not premunition. It is maintained chiefly by the spleen. Examination by cerebral biopsies of chickens infected with *P. gallinaceum* demonstrated that after 25 days the capillary endothelium became immune to further invasion by the parasite, and neither splenectomy nor superinfection could restore its susceptibility; on the other hand, the blood cycle progressed in the usual way, persisting on a low scale for life. Thus there is a true immunity in this species against exo-erythrocytic stages, with premunition only in regard to the blood forms.

P. C. C. Garnham

Gilles, Cynthia W. & Singer, I. **The Effect of Streptomycin on *Plasmodium berghei* Infections in White Mice.** [Research Notes.] *J. Parasitology*. 1953, Apr., v. 39, No. 2, 227.

Dihydrostreptomycin sulphate, 6000 μgm. daily given subcutaneously, increased the survival time of 20 mice infected with *P. berghei*, but did not significantly affect the course of the parasitic infection. The increased survival time is attributed to the probable repression of secondary bacteria.

Bück, G., Coudurier, J. & Quesnel, J. J. Sur deux nouveaux *Plasmodium* observés chez un Lémurien de Madagascar splénectomisé. [**Two New Plasmodia Found in a Splenectomized Lemur in Madagascar**] *Arch. Inst. Pasteur d'Algérie*. 1952, Sept., v. 30, No. 3, 240–43, 1 coloured pl.

The blood of a lemur (*Lemur fulvus rufus*) was examined at Tananarive, Madagascar, and was found to contain scanty malaria parasites. After splenectomy the animal became ill and parasitaemia increased, and a study was made of the organisms, which appeared to belong to two species. The first—named *Plasmodium girardi*—causes no enlargement or stippling of the erythrocyte, the youngest forms have a ring shape and are not amoeboid, and dark brown pigment granules appear, which clump on the surface of the parasite. The mature schizont resembles *P. inui* and possesses 8 to 10 or 12 merozoites; male and female gametocytes have large pigment granules in 1 to 6 masses. A week later, a second parasite made its appearance, easily differentiated from the first by the enlargement of the infected corpuscles and the amoeboid character of the cytoplasm. The chromatin remained undivided, the pigment was light brown in colour and no schizonts or gametocytes were seen. The second species is named *P. foleyi*. [*P. foleyi* is said to resemble *P. vivax*, but this similarity is superficial—there were no Schüffner's dots and no division forms; it seems more likely that this parasite is not a true *Plasmodium*, but belongs to that numerous group which exhibits only gametocytes in the blood.] *P. C. C. Garnham*

Thompson, P. E., Reinertson, J. W., Bayles, Anita & Moore, A. M. **The Curative Action of Antimalarial Drugs against** *Plasmodium lophurae* **in Chicks.** *J. Infect. Dis.* 1953, Jan.–Feb., v. 92, No. 1, 40–51. [58 refs.]

In this investigation a method is described for assessing the curative action of various classes of anti-malarial drugs against an established infection of *P. lophurae* in chicks. The chief object of the study was to develop a procedure and apply it to the screening of substances with possible activity against *P. vivax* infections since it had been observed previously that pamaquin (plasmoquine), which is of value for treating the latter infection, is also curative in *P. lophurae* infections. The chickens used were 1 week old and maintained on a 4-hour light and dark schedule. They were infected intravenously with 10^9 parasites per kgm. of body weight. Drugs were administered in the diet for 1 week at maximum tolerated doses following the acute phase of blood infection. The results were expressed with reference to those obtained with quinine.

Having observed the course of normal infection the authors attempted to produce relapses by various methods without success. It was found that subinoculation of fresh birds provided a reasonable indication of the presence of latent infections. Cure was considered to have occurred when subinoculation from a donor bird failed to produce infection in a fresh host and when the donor itself proved susceptible on re-inoculation.

Forty-nine substances from 23 different chemical groups, which are listed in a table, were tested singly or in combination at the highest tolerated dosage level. Curative substances found included two naphthoquinones and six 8-aminoquinolines. Pamaquin was found to act synergically with one of the naphthoquinones but the latter proved unpromising in the treatment of human malaria. The curative effect of the 8-aminoquinolines, which included pamaquin, pentaquine, isopentaquine, primaquine, and two others, was not enhanced by quinine and there was poor correlation in the results obtained with human and avian malaria, and it appears to the authors that the avian test is not encouraging for the selection of 8-aminoquinolines with curative properties in *P. vivax* malaria. A number of recognized antimalarials tested had no curative properties in *P. lophurae* infections.

J. D. Fulton

Becker, E. R. & Schwink, T. M. **The Nature of the Sparing Phenomenon. II. Activity** *in vivo* **and Nature of the Sparing Substance.** *J. Infect. Dis.* 1953, Jan.–Feb., v. 92, No. 1, 74–6.

Previous work by the authors on the sparing phenomenon has been reported [this *Bulletin*, 1951, v. 48, 1084, 1085]. It was then observed that duck plasma or serum injected intravenously into chicks a short time before and again after the introduction by the same route of duck cells infected with *P. lophurae* protected these infected cells from the defensive mechanisms of the new host. The same plasma or serum also prevented haemagglutination of duck erythrocytes in chicken plasma *in vitro*. It was found that in the *in vitro* experiment these substances could be replaced by alcoholic extracts of duck liver or by duck seromucoid obtained from plasma. The latter substances have now been tested *in vivo*. The chicks were 8 to 9 days old and received 2×10^8 parasitized duck red cells intravenously. Tests with the liver extract were made on 43 experimental birds and the same number of controls: 20 experimental and 20 control birds were used in the case of seromucoid. It was found that *in vivo* both substances

exerted a sparing effect. The conclusion was reached that the *in vivo* sparing substance and the *in vitro* haemagglutinin-inhibiting substance are identical. *J. D. Fulton*

Manwell, R. D., Alpert, S. & Powers, D. **Experimental Chemotherapy of *Plasmodium hexamerium* Infections.** *J. Parasitology.* 1953, Apr., v. 39, No. 2, 209–14.

"Quinine, quinacrine, pamaquine, and primaquine, and a combination of quinine and primaquine, have been used in the treatment of blood-induced *Plasmodium hexamerium* infections of the duck. Of these drugs, or combination of drugs, only quinacrine proved really effective. All cases treated with it were sterilized. The next most effective of the drugs was pamaquine, followed by primaquine and quinine. The last was especially ineffective, neither being able to cure nor even to cause consistently the disappearance of parasites from the blood.

"Although quinine used with primaquine considerably enhanced the effectiveness of the latter, the combination was not equal to either quinacrine or pamaquine used alone, and did not equal its reported performance in human malaria (*P. vivax*)."

Huff, C. G. **Studies on the Exoerythrocytic Stages of *Plasmodium gallinaceum* during the "Transitional Phase".** *Exper. Parasit.* New York. 1952, Nov., v. 1, No. 4, 392–405, 2 figs.

When sporozoites of avian malaria are introduced into the host, the first effect is the invasion of lymphoid-macrophage cells, secondly, later generations go predominantly to the capillary endothelium and thirdly, the red blood cells themselves are parasitized. The transition from the second to the third stage is accompanied by a spectacular increase in parasitaemia, and observations were made on two chicks infected with *Plasmodium gallinaceum* to see what exactly was happening in the tissues at this critical moment. Exo-erythrocytic parasites were most frequent in spleen, lung, heart, kidney, and liver; least frequent in brain, intestines, thymus and testis. The type of parasite was chiefly immature or mature schizonts in the organs, in contrast to the high proportion of young trophozoites in the blood. Degenerating parasites (possibly produced by the action of immunity) were particularly common in the kidney, spleen and thymus, and were infrequent in the brain and intestine.

Careful study was made of the relative size of merozoites in the exo-erythrocytic schizonts, and instead of the usually accepted dimorphism into macro- and micro-merozoites, a gradation from extreme sizes with a normal variation curve (accounting for 80 per cent. of the parasites) in between was clearly demonstrated. So-called macroschizonts were encountered more often in the pre-erythrocytic than in the phanerozoic stage, and the author thinks that the shift in frequency is due to the transition of the parasite from lymphoid-macrophage to endothelial cells. There is no proof that the larger type is destined for tissue development, and the smaller for erythrocytic; and it is just as impossible to decide what makes an exo-erythrocytic merozoite invade tissue or blood as it is to determine why a blood form grows either into a schizont or a gametocyte.

P. C. C. Garnham

Weathersby, A. B. **The Role of the Stomach Wall in the Exogenous Development of *Plasmodium gallinaceum* as studied by means of Haemocoel Injections of Susceptible and Refractory Mosquitoes.** *J. Infect. Dis.* 1952, Sept.–Oct., v. 91, No. 2, 198–205, 3 figs.

This paper gives details of a new and ingenious technique for studying the exogenous development of the malaria parasite (*Plasmodium gallinaceum*). Sporozoites, oöcysts and blood containing gametocytes were introduced into the haemocoelom of clean mosquitoes (*Aëdes aegypti* and *Culex pipiens*). The mosquitoes were deprived of water for 24 hours to desiccate them and they were then immobilized by cold. The injections were made by glass pipettes drawn out to 40–50 μ in diameter and were controlled by a rubber tube vacuum; the point of entry was just posterior to the meso-thoracic spiracle and sufficient fluid was injected to distend fully the abdomen. About 20 per cent. of the mosquitoes injected with saline suspensions survived—but only 2–4 per cent. survived the blood inoculation. *P. gallinaceum* normally develops readily in *Aëdes aegypti*, but not in *C. pipiens*. The same results followed in these experiments—21 per cent. *Aëdes aegypti* showed sporozoites in the salivary glands after the sporozoite inoculation, 23·5 per cent. after the oöcyst inoculation and 24 per cent. after the blood. All the injected *C. pipiens* proved negative. These experiments expose a new field for investigation—susceptibility and resistance of insects to parasites; they already show that the natural route of infection is not the only one, and that fully developed sporozoites are destroyed in the haemocoelom of a resistant host.

P. C. C. Garnham

Rodhain, J. & Andrianne, V. F. Deux nouveaux cas d'infestation par *Plasmodium* chez des pingouins. [**Two New Cases of Penguin Malaria**] *Ann. Parasit. Humaine et Comparée.* 1952, v. 27, No. 6, 573–7, 5 figs.

Two ringed penguins (*Pygoscelis antarctica*) in Antwerp Zoological Gardens were found infected with *Plasmodium relictum*, the parasite showing the typical morphology; young erythrocytes were preferentially invaded, multiple infection of corpuscles was common, and exo-erythrocytic forms were present in the organs, particularly the lungs. About the same time a dead guillemot gull (*Uria aalge*) was found infected with a similar type of parasite, which also exhibited exo-erythrocytic schizonts in the lungs. The latter parasite was unable to infect finches. All 3 infections were in birds which had lived in the Antwerp Zoological Gardens for over a year and the malaria was thought to have been contracted there.

[The authors state that penguin malaria had previously been described by Scott (1926), Rewell (1947) and Rodhain (1936 and 1938). A further record was made by Fantham and Porter in 1944 (*Proc. Zool. Soc.* Part III, v. 44, 279) from Saldanha Bay and named *P. relictum* var. *spheniscidae*).]

P. C. C. Garnham

BLACKWATER FEVER

Linley-Adams, J. C. **Blackwater Fever treated with Cortisone. Case Report.** [Memoranda.] *Brit. Med. J.* 1953, Apr. 11, 819–20.

The author records the case of an African boy of 19 months in Nigeria who developed a severe attack of blackwater fever and was apparently

moribund. On the day after admission, he was given 100 mgm. of cortisone intramuscularly: the next morning he sat up and ate and his temperature and pulse rate had fallen. He had taken 70 oz. of fluid in 24 hours and had excreted 8·5 oz. although he had been incontinent in the previous 24 hours. The first 3 specimens of urine after the injection were less dark and the next 3 were normal in colour. The dose of cortisone was repeated that day and 50 mgm. were given on each of the next 2 days, by which time the patient was sitting up. On these days urinary output was about 20 oz. a day and methaemoglobinuria was no longer present. After specific treatment for the accompanying *P. falciparum* infection (mepacrine was given) and the anaemia, the child made an uneventful recovery.

The author states: "It is suspected that blackwater fever is a haemolytic disease occurring in those infected with *P. falciparum* and whose cells have been sensitized by quinine." The child in this case had received an injection of quinine on the day of his admission to hospital.

The cortisone was given in the hope that it might reduce the sensitivity of the tissue cells to the circulating haemolysin and relieve the renal cortical ischaemia responsible for the anuria. It is believed that in this case cortisone had an effect. *H. J. O'D. Burke-Gaffney*

TRYPANOSOMIASIS

Bureau Permanent Interafricain de la Tsé-tsé et de la Trypanosomiase. No. 195. Léopoldville (Congo Belge). **International Scientific Committee for Trypanosomiasis Research. Fourth Meeting, held at Lourenço-Marques, from the 25th to 30th September, 1952.** Fascicule 1 (Mimeographed Papers 1–10). Fascicule 2 (Mimeographed Papers 11–29).

The meeting was attended by representatives of Belgium, France, Portugal, Southern Rhodesia, the Union of South Africa, the United Kingdom, the Anglo-Egyptian Sudan, the Belgian Congo, the World Health Organization, and the United States of America. The subjects debated were human and animal trypanosomiasis and tsetse flies, and 29 scientific papers were presented. The discussions on human and animal trypanosomiasis dealt with cartography and epidemiology, diagnostic methods, therapeutics and chemoprophylaxis; the entomological subjects were the distribution, ecology and control of tsetse flies.

The discussions resulted in the recording by the Committee of observations, conclusions and recommendations, the chief of which are briefly mentioned as follows:

Sleeping sickness. More epidemiological studies in endemic areas are needed, and special attention should be paid to natural human resistance to infection. The Committee confirmed their opinion expressed at the Brazzaville Conference [see this *Bulletin*, 1948, v. 45, 875] that normal cerebrospinal fluid [c.s.f.] should contain not more than 3 cells per cmm. and 0·025 gm.—100 ml. of protein as shown by precipitation with trichloracetic acid in the Sicard and Canteloube tube; all types of alteration in the c.s.f. should be fully studied. Culture of blood or bone-marrow is not practically useful except in relapse after treatment. They deprecated the use of the expressions "cryptic," "latent" and "non-apparent" infections

and stated that diagnosis should be based on 3 kinds of evidence—trypanosomes seen, clinical evidence, and transmissibility, giving 6 possible combinations; serological and other data could be added. In chemotherapy the drug Mel B should only be given under medical supervision in hospital and it is especially indicated in cases resistant to tryparsamide; in the nervous stage of *T. gambiense* infection the most suitable dosage of Melarsen oxide is daily injection for 3 days of 3 mgm./kgm. The experimental use of a mixture of pentamidine and moranyl [suramin] should be continued. Maps to show the effect of prophylactic pentamidine should have 7 colours to show indices of infection from 0 to over 3 per cent. respectively.

Animal trypanosomiasis. The Committee decided against the proposed preparation of a pan-African map of the distribution of animal trypanosomiasis; each territory should make its own map, with special reference to domestic animals. The recent work on *T. vivax* in rats, done at the West African Institute for Trypanosomiasis Research, was regarded as extremely important: it is briefly described in a paper by Desowitz and Watson, presented at the meeting, which shows how *T. vivax* can become established in rats by the temporary aid of bovine or sheep serum. More work on therapeutics and prophylaxis is required, and a plan to permit new drugs to be tested simultaneously in different African territories should be adopted.

Tsetse flies. The recent work on the ecology of *G. palpalis*, done at the West African Institute for Trypanosomiasis Research, is regarded as important; a short description is given in a paper by Nash and a monograph on the subject is in preparation. The success obtained in Zululand by spraying insecticides from aircraft is impressive and the method should be tried elsewhere; the use of chemical defoliants against tree-tops in forests harbouring *G. palpalis* should be studied.

The rest of the Report consists of scientific papers which together form an interesting and valuable record of recent work on trypanosomiasis.

J. F. Corson

West African Institute for Trypanosomiasis Research. **Annual Report 1951** [Mulligan, H. W., Director]. 26 pp., 2 pls. [1953.]

This is the first Annual Report of the West African Institute for Trypanosomiasis Research which was opened at Kaduna, Nigeria, on January 31, 1951, by Sir John Macpherson, the Governor of Nigeria. A short account is given of the origin and development of the scheme from 1945 [see also this *Bulletin*, 1952, v. 49, 20]. Provision was made for a sum of over £300,000 for expenditure up to March 31, 1951, and, from April, 1951, of £60,000 per annum for recurrent expenditure. The Institute, needless to say, is well equipped for research on all aspects of trypanosomiasis; it has 4 scientific sections—Entomology and Epidemiology at Kaduna and Protozoology and Veterinary Work at Vom (which is free from tsetse flies); each section has accommodation for a visiting scientist. All the laboratories are supplied with water, gas and electricity; it is possible to maintain many hundreds of small laboratory animals and 100 head of cattle or other large mammals.

On the staff are 19 senior officers, including the Director, research scientists, laboratory superintendents, and two administration secretaries; in addition there are over 50 technical assistants and a number of clerks, stenographers, motor drivers, craftsmen, messengers, animal tenders, etc.

A short account of research work is given; in the Entomology Section it includes a study of the breeding of tsetse flies in the laboratory; work on the ecology of *Glossina palpalis* done at Katabu near Kaduna (to be published as a monograph); studies on *G. morsitans*; observations on the natural resting places of various species of tsetse flies; the preparation of an "All African Tsetse Map"; erosion in relation to the clearing of riverine vegetation; and forest reservations. Epidemiological researches included the study of previous records of sleeping sickness outbreaks which produced evidence of the presence for many years of two endemic foci—one near the junction of the Niger and Benue rivers where the disease was of the *T. gambiense* type, and the other in the Lake Chad basin where the infection was more virulent, somewhat resembling that of *T. rhodesiense*. The spread of the disease from these foci to meet near Anchau in Zaria Province has been traced. The effect of European rule on the life and habits of the African population has been studied. Epidemiological surveys in selected areas have been made.

Some of the newer trypanocidal drugs have been tried and compared in human and animal trypanosomiasis; they include melarsen, melarsen oxide, mel B, mapharsen, pentamidine isethionate, in man, and antrycide, phenanthridinium compounds, and "528" [this *Bulletin*, 1952, v. 49, 250] in animals.

Workers in the Protozoology Section found that *T. vivax* could be established in rabbits and white rats by syringe-passage with the aid, in the earlier passages, of sheep- or ox-blood serum; the factor responsible is in the serum-protein. This and other researches on *T. vivax* will shortly be published. In the Veterinary Section the tolerance of the native N'dama cattle to trypanosomiasis was investigated [this *Bulletin*, 1953, v. 50, 18], and an epidemic of *T. simiae* infection in pigs was studied.

The 4 Appendices give a list of scientific papers by the Staff; a list of members of the Managing Committee; a list of some distinguished visitors to the Institute; and a statement of income and expenditure for the year 1951–52. [See also this *Bulletin*, 1948, v. 45, 244, 689; 1951, v. 48, 241, 338, 718, 957; 1952, v. 49, 240, 242, 243, 759.] *J. F. Corson*

Leeson, H. S. **The Recorded Distribution of certain Tsetse Flies and of Human Trypanosomiasis in Africa.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1953, Mar., v. 47, No. 2, 130–33, 4 figs. [10 refs.]

The present paper consists essentially of four maps and a brief text explaining the method by which the material has been assembled and shown. The first two maps deal with 6 species of *Glossina* concerned in the dissemination of trypanosomiasis: the first map shows the distributions of *G. morsitans*, *palpalis* and *swynnertoni*, the second those of *longipalpis*, *pallidipes* and *tachinoides*. The distribution of sub-species and races is not shown separately. The second two maps show the recorded distribution of *Trypanosoma gambiense* and *rhodesiense* based on records published since the year 1920.

It is evident that the assembly of the material and the transferring of it to the map has been done in a thorough and critical way. The maps are of great value for they serve to show the present state of affairs and to draw attention to certain gaps in knowledge: for instance, we are insufficiently informed about the distribution even of *G. palpalis* and *morsitans* in a region in Equatorial Africa a little to the south of Lake Chad, and there are a number of isolated records of *G. longipalpis* in Central Africa which may indicate that it has a widespread distribution at present unrecorded.

There is always a large personal element when it comes to transferring recorded facts to a map: is one to mark several isolated spots, or to assume a continuity and unite them in a large area? Leeson's tendency has been to hold rather closely to the recorded facts, particularly in showing the distribution of the trypanosome infections. A very large amount of information is displayed in this short paper. *P. A. Buxton*

Ceccaldi, J. Nouvelle contribution au traitement de la trypanosomiase humaine par l'Arsobal ou 3.854 RP. Son efficacité chez les anciens trypanosomés atteints de méningo-encéphalite, résistants aux trypanocides généralement utilisés. [**New Observations on the Treatment of Trypanosomiasis by Arsobal (3854 RP). Efficacy in Old Cases with Meningo-Encephalitis Resistant to the Usual Trypanocides**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 95–121.

One hundred and five patients in French Equatorial Africa, suffering from trypanosomiasis [presumably *T. gambiense*] with early meningo-encephalitis, who had not responded to treatment with the usual trypanocidal drugs (pentamidine, lomidine, moranyl, tryparsamide, Mel B or 3177 RP) were then treated with Arsobal, 3854 RP. [See this *Bulletin*, 1950, v. 47, 824].

The patients were divided into groups according to the drug treatment they had already received, and into sub-groups according to whether parasites could be recovered from them or not. One batch of 60 patients was given a total of 28·8mgm./kgm. of 3854 RP intravenously in 2 series of injections given daily for 4 days, each injection being a dose of 3·6 mgm./kgm. with a maximum of 180 mgm. for a single injection. The interval between the series of injections was 8 to 15 days. A second batch of 27 patients was given a total of 21·6 mgm./kgm. of 3854 RP intravenously, in 2 series of 3 injections. Each dose was at a level of 3·6 mgm./kgm. with a maximum of 180 mgm. for a single injection, and these injections were given on alternate days. The interval between the series of injections again was 8 to 15 days. A third batch of 18 patients was given the same drug in varying dosage schedules.

The results of these treatments are set out in considerable detail in full case histories in an appendix, and they are analysed in the text in a series of tables [which should be consulted in the original by those interested]. The broad conclusion is reached that 41·46 per cent. of the first batch of patients (those treated with the bigger dosage) from whom parasites were not recovered, and 42·1 per cent. of those of this batch from whom parasites had been recovered, benefited from the treatment. These results are based on study of only those patients who could be watched for intervals of 7 months to nearly 3 years after treatment. The corresponding figure for the second batch of patients (treated with the lower dosage) was 36 per cent., but only apparently parasite-free patients were available for this estimate. The higher dosage of 3854 RP, therefore, gave a greater cure rate than the lower, though the failures to cure were greater among patients from whom parasites were recovered than among those from whom they were not recovered.

Treatment with 3854 RP proved effective in curing 40 per cent. of patients refractory to the usual trypanocidal drugs, who without it would have died. A single course of treatment with this drug suffices, as repetition of the treatment does not increase the proportion of those cured by it. Six patients (5·71 per cent.) died while under treatment with 3854 RP, but

only 1 (0·95 per cent. of those treated) of these deaths was thought indisputably to be attributable to the drug; 4 other patients (3·8 per cent. of those treated) suffered from manifestations of toxicity which yielded to treatment with BAL and adjuvant measures. *A. R. D. Adams*

Ceccaldi, J., Trinquier, E. & Arnoult, H. De l'emploi de la trépolysine (4.000 M.) ou camphosulfonate de mèta-amino-para-hydroxy-phényl-arsénoxy dans le traitement de la maladie du sommeil. [**The Use of Trepolysin (Camphorsulphonate of Oxophenarsine, or 4000 M) in Sleeping Sickness**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 87–95.

See also this *Bulletin*, 1953, v. 50, 93.

Dias, E. Doença de Chagas nas Américas. I—Estados Unidos. *Rev. Brasileira Malariologia.* Rio de Janeiro. 1951, July, v. 3, No. 3, 448–72, 6 maps. [63 refs.] English summary. II—Mexico. *Ibid.*, Oct., No. 4, 555–70, 6 maps. [47 refs.] English summary. III—América Central. *Ibid.*, 1952, Jan., v. 4, No. 1, 75–84, 3 maps. [60 refs.] English summary. [**Chagas's Disease in the Americas: I. The United States. II. Mexico. III. Central America**].

The work here published is a compilation from the literature, which was begun for the chapter on " Chagas's Disease " in the *Welt-Seuchen-Atlas* under the direction of Prof. E. Rodenwaldt, of Heidelberg. In each of the 3 parts, the locality records of the different species of triatomine bugs are set out in detail, and also indicated on maps. The records of natural infection with trypanosomes are tabulated, both with regard to the insect vectors and to the mammalian reservoirs, and the literature on human infections is discussed. In the United States and Mexico, human infection is more potential than actual, this being given due consideration in the discussion. The parts of this work so far published do not deal with America, south of Panama, in which the endemicity of Chagas's disease is much higher than in the areas examined here. *A. J. P. Goodchild*

Laranja, F. S., Dias, E., Duarte, E. & Pellegrino, J. Observações clínicas e epidemiológicas sôbre a moléstia de Chagas no oeste de Minas Gerais. [**Chagas's Disease in Western Minas Gerais**] *Hospital.* Rio de Janeiro. 1951, Dec., v. 40, No. 6, 945–88, 34 figs. [35 refs.] English summary.

Chagas's disease is of much importance in the nosology of the western parts of the State of Minas Gerais, not only by reason of the disease itself but also as a cause of chronic heart disease. The authors have made a study of the disease along a distance of 130 kilometres through which passes the Rede Mineira de Viação railway. They inspected nearly 100 dwellings and captured close on 1,000 Triatomidae, some 93 per cent. of which were *Triatoma infestans* and 6·6 per cent. *Panstrongylus megistus*. Of 697 bugs examined 19·9 per cent. were infected with *T. cruzi*. Sera of 312 railway employees and members of their families over 5 years of age were examined by complement fixation, with cultures of *T. cruzi* as antigen; 122 (39·1 per cent.) were positive; 62 persons were examined by xenodiagnosis and 5 of these were positive; 3 of 68 sera tested by the Wassermann reaction for syphilis were positive. Histories were obtained and clinical tests made (symptoms, physical signs, ECG recordings) in all patients whether positive or negative to the c.f. test. ECG abnormalities were observed in 34 of 104

of the positive group examined and in 6 of 176 from the negative group. The changes detected are given in detail and electro-cardiograms are reproduced, together with good photographs and photo-micrographs of the histological changes in the heart. Affections of the heart and aorta were seen in 55 of the 312, and 34 suffered from chronic heart disease due to *T. cruzi* infection; 11 had arteriosclerosis, 5 had syphilitic aortitis; rheumatic heart disease was found in 2 and coronary sclerosis in 1. In a few (5) instances there was an association of causes, such as syphilis and Chagas's disease. During 4 years' subsequent observation 7 of those with chronic heart disease had died. *H. Harold Scott*

Nakamura, M. & James, Magdelena B. **Effect of Purine Derivatives on *Trypanosoma cruzi in Vitro*.** *Exper. Parasit.* New York. 1953, Jan., v. 2, No. 1, 19–26. [27 refs.]

So far no satisfactory drug has been discovered for the treatment of Chagas's disease. It has been suggested that some purine and pyrimidine derivatives act as anti-metabolites against certain micro-organisms. This investigation deals with the action of 1 pyrimidine and 9 purine derivatives against *T. cruzi in vitro*. A stock culture of this organism was maintained at 25°C. on a diphasic medium with blood agar as the solid portion. The effect of the agents on the oxygen consumption of the trypanosome at 37·2°C. was studied in a conventional apparatus with air as the gas phase. At the end of a 2-hour period the trypanosomes were examined for motility. All the substances tested reduced oxygen consumption and this inhibition was correlated with absence of motility at the end of the observation period. The effect of the same substances in concentrations which had reduced 0_2 uptake was also observed on cultures of the organism under both aerobic and anaerobic conditions, and the substances were found to inhibit growth. The range at which trypanocidal properties were shown varied from 1/750 to 1/30,000. The most active substance tested was 2 : 6-diamino purine. *J. D. Fulton*

Barth, R. Estudos anatômicos e histológicos sôbre a subfamília Triatominae (Heteroptera, Reduviidae). I. parte: A cabeça do *Triatoma infestans*. [**Anatomical and Histological Study of the Triatominae. I. The Head of** *T. infestans*] *Mem. Inst. Oswaldo Cruz.* 1952, Mar., v. 50, 69–155, 36 figs. [14 refs.] [German version 156–96.]

Dias, E., Pinto, O. da S., Pellegrino, J. & de Castro, J. A. Ensaio experimental de luta contra os triatomíneos por meio de inseticidas de ação residual. (Nota prévia.) [**Experimental Trial of the Control of Triatomine Bugs by Means of Residual Insecticides. (Preliminary Note)**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Jan., v. 4, No. 1, 22–46, 6 graphs. [28 refs.] English summary.

Experiments on the treatment of dwellings (both mud huts and brick houses) with residual insecticides, for the control of triatomine bugs, were carried out near Uberaba, State of Minas Gerais, Brazil. The predominant species of bug, and local vector of Chagas's disease in that region, is *Triatoma infestans*. After treatment with insecticides the dwellings were inspected daily up to 80 days, and all dead and dying bugs were collected and counted. Different groups of houses were treated once, twice or three times, at intervals that varied from 2 to 7 months, and the daily inspections

were made during 20 days after the second and third sprayings. Finally, any remaining bugs were captured and counted by means of a pyrethrum dust, which was repeated after an interval of 5 to 16 months.

In 446 treated dwellings a total of 42,794 triatomine bugs were captured, 90 per cent. of them after the first spraying, 4·6 per cent. after the second, 0·5 per cent. after the third, and 4·8 per cent. during the two final dustings. The insecticides used were BHC, chlordane, and DDT, of which BHC, at a dosage of 500 mgm. per square metre, was the most effective. It was concluded that spraying need not be repeated at intervals of less than six months. *A. J. P. Goodchild*

Packchanian, A. **Chemotherapy of Experimental Chagas' Disease with Thirty Antibiotics.** *Amer. J. Trop. Med. & Hyg.* 1953, Mar., v. 2, No. 2, 243–53. [17 refs.]

"The following antibiotics were tested against *Trypanosoma cruzi* both *in vitro* and *in vivo*, 23 for the first time: 1. acti-dione; 2. antibiotic S; 3. aureomycin hydrochloride; 4. bacillin culture filtrate; 5. bacitracin-topical; 6. borrelidin sodium; 7. Bristol A6786–52; 8. chloramphenicol (chloromycetin); 9. circulin (antibiotic Q-19); 10. dihydrostreptomycin sulfate; 11. endomycin; 12. fradicin; 13. fumagillin; 14. gliotoxin; 15. gramicidin; 16. neomycin sulfate; 17. penicillin G sodium; 18. penicillin O potassium (allymercaptomethyl); 19. 1,2-diphenyl-2-methylamine ethanol penicillin; 20. pleocidin; 21. polmyxin B sulfate; 22. rimocidin; 23. streptomycin sulfate; 24. subtilin; 25. terramycin hydrochloride; 26. thiolutin; 27. tyrocidine hydrochloride; 28. tyrothricin; 29. viomycin sulfate; 30. viridin.

"*In vitro* tests were performed by a newly developed method with the 30 antibiotics against two strains of *Tr. cruzi* (Pack-Brazil-46 and WBHT). Out of the 30 antibiotics, 18 showed immobilizing or trypanocidal effects at the end of 5, 10, 15, and 60 minutes or at the end of 24 hours. The trypanostatic or trypanocidal effects ranged from dilutions of 1:10 to as high as dilutions 1:400,000, depending upon the antibiotics and time of contact periods. The remaining 12 antibiotics (Nos. 4, 5, 6, 7, 10, 13, 15, 16, 18, 19, 23, 29), used in highest concentrations practical, were innocuous to *Tr. cruzi in vitro* at the end of 24 hours' exposure period.

"*In vivo* tests, in spite of the above findings, were all essentially negative. None of the above 30 antibiotics, when administered intraperitoneally in maximum tolerated doses into mice infected with the virulent WBHT strain of *Tr. cruzi*, produced an absolute cure. All of the experimental animals, with the exception of a few which developed chronic infections, died of acute trypanosomiasis within two weeks. A few instances of suppressive action were obtained with the following antibiotics: endomycin, gramicidin, rimocidin, antibiotic S, thiolutin, tyrocidine hydrochloride, tyrothricin, and viridin. Although there were definite reductions in the number of trypanosomes present in the blood of these mice as compared with the number in the untreated mice, many died earlier than did the controls because of the toxicity of the drugs. The most marked suppression was produced by antibiotic S. However, no curative effects were obtained."

FEVERS OF THE TYPHUS GROUP

Wojciechowski, E. & Mikolajczyk, E. Porównanie właściwości riketsji wyosobnionych z przypadków duru plamistego epidemicznego i sporadycznego. [**The Comparison of Rickettsiae isolated from Cases of Epidemic and Sporadic Typhus Fever**] *Med. Dośw. i Mikrob.* Warsaw. 1953, v. 5, No. 1, 103–12, 1 fig. [10 refs.]

The English summary appended to the paper is as follows:—

"The biological and serological properties of four strains of typhus fever rickettsiae have been compared. Two of these strains were isolated from cases of epidemic typhus fever and two other strains from sporadic typhus fever. Complete cross immunity has been stated on guineapigs between the investigated strains. The lack of virulence for young white mice and the same results in agglutination test, absorption test and complement fixation test allow us to classify all the strains as epidemic typhus rickettsiae. Insignificant differences in the sensitivity of the agglutinogen and the complement fixing antigen do not contradict the above mentioned classification since they appeared both in strains isolated from epidemic and from sporadic typhus fever."

Chang, Shih-man; Snyder, J. C.; Murray, E. S. **A Serologically-Active Erythrocyte-Sensitizing Substance from Typhus Rickettsiae. I. Isolation and Titration** [Chang]. *J. Immunology.* 1953, Mar., v. 70, No. 3, 212–14. [14 refs.] **II. Serological Properties** [Chang, Snyder & Murray]. *Ibid.*, 215–21.

Certain bacterial antigens called erythrocyte-sensitizing substances, or ESS for short, are known to be capable of adsorption on erythrocytes which then become agglutinable by antisera of the same bacteria. The ESS have not been described as occurring in rickettsiae but the author now describes a method by which they can be set free from suspensions of *Rickettsia prowazeki* or *R. mooseri* made from yolk-sac cultures. The suspensions are heated in dilute alkali at 100°C. and purified by shaking with chloroform. After centrifuging the mixture, the aqueous phase containing the ESS is separated and titrated to the highest degree of dilution at which suitable erythrocytes are fully sensitized to agglutination by standardized antiserum. The product keeps well; after storage at 2–4°C. for 4 months it was still fully active.

The second paper contains a description of the test for typhus antibodies in serum by the agglutination of human erythrocytes sensitized by the ESS of *Rickettsia prowazeki*, and a comparison is made with the results of other serological tests. In 5 sera from patients suffering from epidemic typhus the test became positive at about the same time as rickettsia-agglutination and Weil-Felix tests, and usually earlier than the complement-fixation test. Among 138 sera from patients with other diseases and healthy persons only one gave a positive reaction, and this was from an Italian immigrant who might have suffered from typhus. Epidemic and murine typhus sera gave the same reaction. Advantages of the test are its simplicity and early appearance; in Brill's disease it was positive in the 4 patients tested, though in all of them the Weil-Felix reaction was negative. Economy is another good feature; enough ESS for testing 5,000 typhus sera was obtained from 10 gm. of infected yolk-sac material which would have been enough for only 50 rickettsia-agglutination tests. A serious drawback is that it does not regularly become positive in animals experimentally infected with

typhus. Although the test was found to be specific the titres were sometimes much higher and sometimes much lower than those of the complement-fixation test; they were usually higher, but occasionally were lower than those of the rickettsia-agglutination test.

The test is referred to as the anti-ESS test. [If it should come into general use a suitable name might be the sensitized erythrocyte agglutination test (the SEA test).]

John W. D. Megaw

Quinby, G. E. & Schubert, J. H. **Epidemiologic and Serologic Appraisal of Murine Typhus in the United States, 1948–1951.** *Amer. J. Pub. Health.* 1953, Feb., v. 43, No. 2, 160–64, 1 fig. [11 refs.]

Till about 1946 murine typhus in the U.S.A. was regarded by most workers as having been under-reported, but in that year the disease began to decline, and since that time some observers have been unable to confirm even one-half of the reported cases. In 1948, for example, not even one of the 25 cases reported in a county of Alabama was found to be clinically consistent with the diagnosis.

The authors describe a systematic investigation of the diagnosis made in the cases reported in 9 of the 11 Southern States in which the disease has been endemic during the 4-year period 1948–51. They were able to check 230 of the 351 cases reported in 8 of these States and confirmed 58 per cent. of them by complement-fixation tests at titres of 1/4 or higher and on clinical grounds. In 25 per cent. the diagnosis was found to have been wrong. Nine of the cases were shown to have been of Rocky Mountain spotted fever. Among 99 cases not reported, 40 were tested and 33 per cent. of these were confirmed; in 40 per cent. the diagnosis was definitely wrong. "Certain of the investigators noted that murine typhus had replaced malaria as a wastebasket diagnosis."

John W. D. Megaw

Takemori, N., Henmi, M. & Kitaoka, M. **Simultaneous Multiplication of Two Different Rickettsiae in the Same Cell.** *Proc. Soc. Exper. Biol. & Med.* 1952, Dec., v. 81, No. 3, 633–6, 1 fig. [15 refs.]

The authors have transmitted, for 5 consecutive passages through mice, a mixed infection of the rickettsiae of murine and scrub typhus. They describe and illustrate with 6 photomicrographs the simultaneous occurrence of these rickettsiae in single cells from the infected peritoneum. They state that this is the first time that dual infection of individual cells with two different obligatory-intracellular parasitic agents has been observed microscopically with absolute certainty.

The obvious differences between the strains are said to be that *Rickettsia tsutsugamushi* [*orientalis*] is thicker, is ellipsoidal, often appearing as a diplococcus, coloured deep purplish with Giemsa stain, and usually situated near the nucleus.

References are given to the reported occurrence of various double infections with viruses; a schematic drawing is shown of 2 cells in each of which the virus of lymphogranuloma venereum and murine-typhus rickettsiae are growing simultaneously.

It would be interesting to know the types of serological and febrile reactions occurring in animals having a double infection of the kind described.

John W. D. Megaw

Le Gac, P. **Research on Rickettsial Pox in Oubangui-Chari.** *West African Med. J.* 1953, Jan.–Feb.–Mar., v. 2 (n.s.), No. 1, 42–50, 6 figs.

See also this *Bulletin*, 1952, v. 49, 35, 498, 682.

Price, W. H. **Interference Phenomenon in Animal Infections with Rickettsiae of Rocky Mountain Spotted Fever.** *Proc. Soc. Exper. Biol. & Med.* 1953, Feb., v. 82, No. 2, 180–84.

Experiments are described in which 80 to 90 per cent. of guineapigs inoculated intraperitoneally with 1 part of a strain of *Rickettsia rickettsi* of high virulence and simultaneously with 10 to 30 parts of a strain of low virulence of this organism reacted in the same way as control guineapigs inoculated only with the strain of low virulence. Similar protection against a highly virulent strain of *R. rickettsi* was provided by the simultaneous inoculation of 10 to 30 times the concentration of rickettsiae of Q fever, scrub typhus, endemic [murine] typhus or epidemic typhus.

It was also found that when field mice, cottontail rabbits, or Columbian ground squirrels were infected experimentally by the bites of a few *Dermacentor andersoni* ticks infected with a highly virulent strain of *R. rickettsi* and at the same time by the bites of a large number of the same ticks infected with a strain of the rickettsia of low virulence the resultant infection of the animals was of low virulence.

The possible significance of this interference phenomenon in natural conditions is discussed but much more work is said to be necessary before final conclusions can be drawn.

John W. D. Megaw

Pereira, H. G. & Travassos, J. Estudo comparativo das rickettsias da febre maculosa das Montanhas Rochosas e do " tifo de S. Paulo " pela reação de fixação do complemento. [**Comparative Complement-Fixation Tests in Rocky Mountain Spotted Fever and São Paulo Typhus Fever**] *Hospital.* Rio de Janeiro. 1951, July, v. 40, No. 1, 87–91. [28 refs.]

The English summary appended to the paper is as follows:—

" The antigenic relationship between the rickettsiae of Rocky Mountain spotted fever and the so-called São Paulo typhus was studied by complement-fixation tests in which washed rickettsial suspensions and soluble material were used as antigens.

" These antigens were obtained from infected chick embryo yolk sacs and were purified by ether extraction and centrifugation (Method II of Topping and Shepard).

" Tests in which serial dilutions of antigens were titrated in the presence of constant amounts of immune sera and vice-versa, revealed no differences between the antigenic structure of the strains compared."

Anigstein, L. & Whitney, Dorothy M. **Antirickettsial Activity of a Synthetic Compound related to Chloramphenicol.** *Texas Reports on Biol. & Med.* 1952, v. 10, No. 4, 768–72, 2 figs.

Tests are described of the anti-rickettsial activity of a new synthetic compound related to chloramphenicol which is the only antibiotic that had hitherto been synthesized. The new substance is temporarily described as Ro 1–6,600 by the makers, Hoffmann LaRoche. Guineapigs were treated with the drug, added to the diet at the rate of 0·5 to 2·5 per cent. [100 to 500 mgm. daily], for 2–3 days and then were inoculated with a highly virulent strain of *Rickettsia rickettsi* which had a fatality rate of 75 per cent. The drug was continued after the inoculation and it caused complete suppression of the disease till its withdrawal, which usually was after 8–12 days, when there was often a spell of fever lasting 1–3 days and corresponding to the recurrences of fever seen in many of the cases of scrub typhus after early courses of treatment by chloramphenicol. Complete suppression of the fever occurred when 2 extra doses of the drug, 100 mgm. each, were given daily by forced feeding. All the treated animals were found completely immune to challenge inoculation with *R. rickettsi*.

John W. D. Megaw

Harris, B. P. **Aureomycin in Tick Typhus: Second Series.** *East African Med. J.* 1953, Mar., v. 30, No. 3, 99–110, 8 charts.

After success in treatment of 7 patients in East Africa with a total of 10 gm. of aureomycin in 5 days [this *Bulletin*, 1953, v. 50, 208] the author now records a second series of 8 patients with tick typhus, in whom 7·5 gm. was sufficient for cure. It is suggested that 2 gm. be given daily for the first 2 days, and thereafter half this dose. In adults with severe attacks, 1 gm. daily was usually inadequate.

Derrick, E. H. **The Epidemiology of " Q " Fever: a Review.** *Med. J. Australia.* 1953, Feb. 21, v. 1, No. 8, 245–53. [Numerous refs.]

The author modestly describes this valuable paper as being " compounded of the labours of many researchers in many countries "; he pays a generous tribute to the help received from the *Tropical Diseases Bulletin* and the library staff of the Queensland Institute of Medical Research.

The paper consists of a comprehensive and orderly summary of what is known of the epidemiology of Q fever; the bibliography contains 94 references, each of which is complete with its title. A short history of the discovery of the disease by the author and his fellow workers in Australia would have been greatly appreciated if room could have been found for it.

The name *Coxiella burneti* has been adopted without comment in the paper, so the author seems to accept the view that the infecting agent belongs to a new genus, distinct from *Rickettsia*.

John W. D. Megaw

Garin, J. P. La " Q. fever " au Maroc. Enquête epidemiologique au Tafilalet. [**Q Fever in Morocco. An Epidemiological Enquiry in Tafilalet**] *Bull. Inst. Hyg. Maroc.* 1951, v. 11, Nos. 3/4, 185–206. [201 refs.]

The author describes a survey of the incidence of the agglutinating antibodies of Q fever among the people and domestic animals of 8 localities in the Tafilalet region of French Morocco. Among 759 persons aged 8 years

and over, 37·5 per cent. gave positive reactions with P. Giroud's micro-agglutination test at titres of 1–40 or over. The percentage of positives was lowest in the 8–20 age-group and highest in the 30–40 age-group, the figures for these were 26·7 and 41·5 per cent. respectively.

Sex and occupation had little influence of the incidence.

Among 179 animals tested the incidence in goats was 54·8 per cent.; in cattle it was 44·7 per cent. and in sheep 38 per cent. The results for each district and the total results are shown in separate tables.

John W. D. Megaw

Slavin, G. **"Q" Fever: the Domestic Animal as a Source of Infection for Man.** Reprinted from *Vet. Record.* 1952, Nov. 22, v. 64, 743–50, 2 maps. [39 refs.] Discussion 751–3.

The author describes a survey of the distribution of Q fever among cattle in various parts of Great Britain. The material available was 3,767 samples of bovine blood sent to the Ministry of Agriculture Veterinary Laboratory for various tests and 8,343 samples of blood from guineapigs which had been inoculated with cows' milk in testing for tuberculosis. Positive reactions at titres of 1/8 or over with the complement-fixation test were regarded as indicating past or present infection. When a sample was positive a specimen of milk from the cow and one from the whole herd were obtained when possible.

Among the cattle whose blood was tested 2·1 per cent. were positive.

The guineapig samples came from 2,581 farms in England and 6·9 per cent. of these were infected. Of 553 farms in Wales 2·0 per cent. were infected, and of 240 farms in Scotland 0·8 per cent. were infected.

From many areas few or no samples were received but the widespread distribution of the infection is shown by the following figures which refer to counties in which more than 100 farms have been tested. The figures in brackets show the number of farms in which positive results were found in the sera of guineapigs inoculated with milk from the farm: Cheshire, 149 (20); Devon, 108 (2); Nottingham, 111 (1); Shropshire, 148 (6); Stafford, 427 (40); Sussex, 244 (10); Warwick, 305 (21); Yorkshire, 473 (36); Caernarvon, 107 (0); Glamorgan, 259 (3); Aberdeen, 111 (2).

John W. D. Megaw

Mantovani, A. & Benazzi, P. **The Isolation of *Coxiella burnetii* from *Rhipicephalus sanguineus* on Naturally Infected Dogs.** *J. Amer. Vet. Med. Ass.* 1953, Feb., v. 122, No. 911, 117–18. [17 refs.]

The authors, reporting from Teramo in Italy, describe the isolation of *Coxiella* [*Rickettsia*] *burneti* from the blood of a dog on 3 occasions, and from extracts of ticks, *Rhipicephalus sanguineus*, removed from the dog at intervals of 5–7 days over a period of nearly 2 months. The dog was known to have eaten on several occasions the placental tissues of infected sheep and was believed to have become infected by doing so. The rickettsiae were present intermittently in the ticks which were suspected of transmitting infection among dogs, sheep and cattle.

In two outbreaks of human Q fever, 3 dogs which had been in contact with the families and the sheep concerned were found infected by *R. burneti*, as shown by positive complement-fixation tests 2–10 months after the outbreaks, and the organism was isolated from one of the dogs 110 days after the outbreaks.

John W. D. Megaw

Giroud, P. & Gaillard, J. A. Développement des rickettsies aux dépens du cytoplasme des cellules hôtes au cours de l'infection due à *Rickettsia burneti*, *Rickettsia orientalis*, *Rickettsia mooseri*, *Rickettsia prowazeki* et *Rickettsia conori*. [**Development of Rickettsiae at the Expense of the Cytoplasm of the Host Cells in Infection by** *Rickettsia burneti*, *R. orientalis*, *R. mooseri*, *R. prowazeki* **and** *R. conori*] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 16–19, 5 figs. on 4 pls.

The authors have found that *Rickettsia burneti* is specially suitable for the study of the changes that occur in cells infected by rickettsiae. The cells chiefly invaded are those of the reticuloendothelial system, ranging from the large reticular cells to the motile histiocytes and the monocytes. Small lymphocytes are less often infected, and polynuclears are rarely invaded, their part seems to be to act as phagocytes which deal with rickettsiae liberated from the disintegrated mononuclear cells.

The first changes seen in the invaded cells are in their colour reactions, which vary according to the stain employed. In some cells small vacuoles appear and soon fuse to form a large vacuole which may fill the whole cell and flatten the nucleus against the cell wall. The vacuole may be packed with rickettsiae which are mostly of the bacterial type. Other cells are seen in which there are numerous clusters of rickettsiae. In both types of invaded cells the appearances suggest that the rickettsiae literally feed on the cytoplasm.

The authors believe that the visible rickettsiae are preceded by an invisible stage of which the only evidence is a change in the appearance of the cell cytoplasm.

The paper is illustrated by 5 clear photomicrographs.

John W. D. Megaw

YELLOW FEVER

Ross, R. W., Haddow, A. J., Raper, A. B. & Trowell, H. C. **A Fatal Case of Yellow Fever in a European in Uganda.** *East African Med. J.* 1953, Jan., v. 30, No. 1, 1–11, 2 figs. on 2 pls. [17 refs.]

The recorded deaths from yellow fever among human beings in East Africa to the present date number only 3; 2 of these occurred in Kenya in 1941, and the third in the Sudan, near the Uganda border, in 1942. The present paper is a record of a fourth fatality from yellow fever in East Africa, which took place in January, 1952. The patient was a European, aged 39 years, who contracted his infection in a camp up-country in the Toro District of Uganda, where he was engaged in drilling operations. He suffered from a febrile illness from which he died on the seventh day. Though no diagnosis apparently was made during life the clinical course of the illness conformed to that of classical yellow fever. At autopsy, performed 3½ hours after death, the general appearances were those typically encountered in fatal cases of yellow fever; and histology of the liver showed the presence of Councilman lesions of midzonal distribution and of other changes in the liver held to be characteristic of yellow fever. Attempts to recover the virus unfortunately were unsuccessful; none of many mice, nor a single rhesus monkey, developed antibodies following the inoculation of liver suspension, of serum, or of brain tissue suspension from the cadaver.

The patient's serum after death had a high titre of yellow fever virus antibody; this titre was considered to be much higher than that normally found in vaccinated persons, except during the few months immediately following the vaccination. The patient had himself been vaccinated 4 years and 81 days before his attack.

The clinical course of the illness, the post-mortem findings, the histology of the liver, and the high level of antibody in the serum all confirmed the diagnosis of yellow fever, although the causal virus was not recovered post mortem by the accepted methods.

The local ecology of yellow fever

The camp at Kasunganyanja, situated 37 miles from Fort Portal on the Katwe road, where the patient contracted his infection if the incubation period of his disease was the accepted 3 to 6 days, is in an area in which mass yellow fever inoculation of the population was done some 10 years earlier. The patient himself had lived in aluminium sectional huts unprotected by mosquito screening, located in a clearing in elephant grass some 400 yards from forest. Of sera from 2 grivet monkeys (*Cercopithecus aethiops centralis*) and 8 colobus monkeys (*Colobus polykomos uellensis*) from this forest, 3 colobus sera contained immune bodies and 1 doubtfully did so; the others contained none. The virus of yellow fever was therefore present among monkeys in this forest. Examination of the sera of monkeys from the forest some 5 miles from the camp in previous years had shown nearly half of them to contain immune bodies.

Blood was taken from 16 Africans staying in the vicinity of the camp, but not normally resident there, and 4 of these were found to be immune. Although all 4 Africans may have been vaccinated the titre of the serum of at least one individual was greater than that commonly found in persons immunized with 17D vaccine. Blood was also taken from children below 12 years of age resident in the locality, as mass vaccination had not been done locally since 1941; 9 of the 31 sera examined contained immune bodies, and 6 sera from 23 children aged 10 years or less were immune. This suggests that there is yellow fever infection of man in this area.

The patient when ill spent the infective stage of his illness at Kitumba, which is 3 miles from Fort Portal on the Kampala side of it. He stayed in an unscreened plaster house situated in a banana plantation surrounded by mud and grass huts. There was no local report of cases of yellow fever, but the examination of sera from 46 persons in the vicinity yielded 23 immunes; of 19 children under 10 years of age 2 were immune; of 27 children 11 years of age or more 21 were immune. Mass vaccination had been done 11 years earlier, and therefore seemed to have been effective. The two immune young children probably had not been vaccinated, and this suggested that occasional cases of yellow fever were occurring in the vicinity.

In E. Africa three mosquitoes, *Aëdes aegypti, Aëdes simpsoni* and *Aëdes africanus* are proven vectors of yellow fever virus; specimens of both the latter two have been found to be naturally infected within 50 miles of the camp where the case now reported occurred. Fifteen days after this patient had left Kitumba an examination yielded a few mosquitoes from the house and some surrounding huts, but specimens of none of the 3 recognised vectors were caught. A more extensive examination of the surrounding vegetation also yielded no adults of these species, but some *Aëdes simpsoni* larvae were found. The weather at the time was very dry, and it is, therefore, improbable that the patient was able to infect any of the 3 yellow

fever mosquito vectors; if it had been wet the conditions would have been very different.

At the camp where the infection was contracted, over 120 miles from Kitumba [this is deduced from the statement that the camp " is situated at mile post 124 on the Fort Portal-Katwe Road ", but it seems to conflict with the earlier statement that the camp was " about 37 miles from Fort Portal "], an adult *Aëdes africanus* was caught biting at ground level in a plantation during the day-time. Neither of the other two vectors was found there at the time. In the nearby forest 3 *Aëdes africanus* were taken at ground level by day, and another was taken biting at ground level at sunset. In heavy-canopy forest *Aëdes africanus* seems to stay in the canopy by day; but where the canopy is much broken, as at Kasunganyanja, it tends to be driven down probably by the sun and the wind, and then bites at ground-level by day.

General considerations

Virus recovery from cases of yellow fever is usually possible on the sixth day of the disease, but it is not recoverable later when the serum antibody titre reaches a high level. The successful isolation of virus in the presence of antibody is very rare. Deaths from yellow fever following unsuccessful vaccination have been reported. This particular patient strictly speaking should have been re-vaccinated 81 days before he died, when the 4-year period of his vaccination had expired. Nevertheless, studies have shown that after vaccination with 17D vaccine there is no indication of significant decline in the number of persons showing detectable immunity 4 years after vaccination. It therefore is probable that this patient was not in fact effectively immunized in the first place. Field vaccination with the Rockefeller 17D vaccine has been shown to afford immunity to 80–95 per cent. of those vaccinated. The examination in recent years of sera of persons vaccinated in England, not with Rockefeller vaccine, showed only 29 out of 60 persons to be immune. The vaccine produced in England thus seems to be a less potent immunizing agent than that produced by the Rockefeller Foundation. *A. R. D. Adams*

DENGUE AND ALLIED FEVERS

Hotta, S. **Dengue Epidemics in Japan, 1942–1945.** *J. Trop. Med. & Hyg.* 1953, Apr., v. 56, No. 4, 83, 1 fig.

In August, 1942, a sudden epidemic of dengue occurred in Nagasaki, Sasebo and the Osaka-Kobe district. It began in seamen who travelled between Japan and other Far Eastern areas where dengue was prevalent, for example, New Guinea, the Philippines, Malaya and Indonesia. The position was aggravated by the extensive breeding of mosquitoes in the emergency water tanks set up throughout the country.

The outbreak ended in November, but recurred every summer until 1945. Although the total number of persons affected in the 5 years could not be estimated accurately, the author shows in tables that it amounted to at least 200,000. This was one of the greatest epidemics recorded in temperate regions.

No epidemic occurred in 1946, and it is suggested that the extensive

destruction of the principal cities concerned, as a result of bombing and fire, presumably eradicated the vector mosquitoes [but no evidence is given to show that this was investigated]. *H. J. O'D. Burke-Gaffney*

RABIES

Piedrola Gil, G. & Leria de la Rosa, M. Se resolvera el problema de la rabia? [**The Problem of Rabies**] *Med. Colonial.* Madrid. 1951, May 1, v. 17, No. 5, 451–72.

This contribution is of an introductory nature setting forth important advances which have been made in recent years on the subject of rabies, some of which need confirmation and others amplification.

The authors refer to the subject under the following heads: 1. The use of rodents, rats, mice, hamsters and guineapigs as experimental animals. 2. Cultivation of the virus in chicken embryos, which goes by the name of "avianized" vaccine, the authors prefer the term Ovo-vaccine [which certainly seems more fitting]. 3. The use of U-V. rays for sterilizing the vaccine. 4. In prevention, the administration of anti-rabic serum with the vaccine to avoid accidents due to the vaccine when used alone. 5. Study of the causes of paralytic accidents. 6. Animal prophylaxis by inoculation of all animals, after determining which vaccine to use and the best method of application. 7. Discovery of any fresh reservoirs of the virus, as the mongoose and the vampire bat. 8. The latest views on when to advise treatment and the course of treatment to be adopted. A table is presented showing the different conditions for giving or withholding treatment, such as contact without any lesion, contact with saliva but the skin intact, the same with superficial injuries, bites by dogs suspected of being rabid and by those known to be rabid. Studies of the use of U-V. rays for sterilization have already been abstracted [see this *Bulletin*, 1953, v. 50, 213].

H. Harold Scott

Mercier, S., Courdurier, J. & Lamberton, R. Considérations sur la rage canine et ses incidences humaines à Tananarive. [**Observations on Canine Rabies**] *Rev. Coloniale de Méd. et Chir.* 1953, Mar. 15, v. 25, No. 211, 46–8.

In 1950 and 1951 over 200 persons attended the Pasteur Institute in Tananarive, Madagascar, because of bites from or contact with dogs suspected of having rabies; some 30 persons in each year required anti-rabies treatment. No case of human rabies occurred, but in the two years 12 of 24 and 9 of 26 dogs were proved to have rabies. Only one of these dogs in each year was a stray animal, and of all the suspected dogs only 6 per cent. were without owners. The author makes the point that in the larger urban centres, the danger lies not, as is commonly stated, with the stray dogs, but with the pet animals whose owners allow them to wander about. These are the very dogs which should be most under control and could most easily be vaccinated.

The situation seems to be that 90 per cent. of the dogs causing bites and 90 per cent. of those proved to have rabies are known to be owned. Although there are several thousand dogs in Tananarive, the number licensed in each year barely exceeded 1,000, while the number having had anti-rabies vaccination was under 200. In many cases, the regulations concerning the keeping and control of dogs are not complied with.

The authors make a plea for stricter application of the dog licensing laws, regulations governing ownership and veterinary control of dogs. They note some of the inconveniences which perhaps lead to public apathy, one of these is the cost to the owners of having dogs vaccinated regularly; it is suggested that this should be included in the price of a dog licence.

Most of the persons requiring anti-rabic treatment have come from the principal urban centres and this need might have been avoided if domestic dogs in these limited areas had been adequately and regularly vaccinated. Such vaccination is compulsory in parts of the French Union (for example, North Africa and Indo-China) where it has been applied with success for some years; the classical example of Hungary is quoted, where compulsory vaccination of dogs and veterinary control eliminated rabies almost completely between 1939 and 1944 and again in 1949, although it was present in neighbouring countries.

The authors end by quoting Dr. Fontes of Portugal, who observed [abstracter's translation], "Today rabies prevails only where the administrations tolerate it. . ." *H. J. O'D. Burke-Gaffney*

Brandenburg, H. Zum diagnostischen Tierversuch auf Tollwut. [**On Animal Experiments designed to diagnose Rabies**] *Zent. f. Bakt.* I. Abt. Orig. 1952, Dec. 20, v. 159, Nos. 1/2, 23–39, 6 figs. [27 refs.]

Examination of the brains of suspected animals for signs of rabies is often unsuccessful and animal experiments with the suspected material are not absolutely reliable. In this paper the author goes in great detail into his method of procedure and for these details the original should be consulted. The gist of the article may be stated quite briefly.

The author tested the relative susceptibility of different animals to intramuscular and intracerebral inoculation of rabies material and he found that successful results depended largely on this animal susceptibility. As the result of his investigations he found that the most reliable method was intracerebral inoculation of the brain material together with some antibiotic to obviate bacterial contamination (up to 2,000 units of penicillin and 1 mgm. streptomycin per cc., in doses of 0·03 cc.; stronger solutions caused convulsions, dyspnoea and perhaps death). The antibiotic does not appear to interfere with development of the rabies virus. Mice are very susceptible and are cheap and convenient animals for the tests. At intervals after the inoculation and as soon as any symptoms appear, the brain is examined for Negri bodies. Intramuscular inoculation was much less successful; thus, out of 14 giving a positive to intracerebral inoculation 4 were negative to intramuscular inoculation. A positive result is most likely to be obtained if 6 or, better, 8 mice are inoculated with material from one source. Any animal dying after the fifth day is examined, for a positive result is nearly always obtained in 6 to 12 days. In negative cases the mice will live for 30 days or more; at all events, they are kept under observation for this period. *H. Harold Scott*

Yaoi, H., Takei, M. & Maeda, H. **Studies on the Rabies Vaccine. VIIIth Report: Prophylactic Immunization of Dogs by means of Merzonin-Inactivated Antirabies Vaccine.** *Yokohama Med. Bull.* 1952, June, v. 3, No. 3, 140–50. [24 refs.]

An anti-rabies vaccine of 10 per cent. guineapig brain treated with 0·1 per cent. merzonin (merthiolate) and kept at 37°C. for 5 days is compared with

a 20 per cent. phenolized goat brain vaccine. The Habel potency of this batch of merzonin vaccine was higher than that of the batch of phenolized vaccine compared. A protection test in which 6 dogs were used for each vaccine is said to demonstrate better protection and antibody production by the merzonin vaccine than by phenolized vaccine.

[As only one batch of each vaccine was compared and as the number of dogs is insufficient for significant comparison, these conclusions would appear to need verification.] *C. E. Gordon Smith*

Yaoi, H., Takei, M., Maeda, H., Saito, K. & Yamasawa, R. **Studies on the Rabies Vaccine. IXth Report: Investigation into Materials for making Merzonin Vaccine.** *Yokohama Med. Bull.* 1952, Aug., v. 3, No. 4, 181–9. [10 refs.]

Merzonin vaccines [see VIIIth report, above, 1953, p. 622] were prepared from the brains of mice, guineapigs, rabbits, dogs and goats. Separate vaccines were made from cerebrum, cerebellum and cord in the larger animals. These vaccines were compared by the Habel test. In the larger animals it appears that the cerebrum contains more virus than the cerebellum and the cord still less. The authors recommend that the cerebrum only should be used for vaccine production. *C. E. Gordon Smith*

PLAGUE

Walker, D. L., Foster, L. E., Chen, T. H., Larson, A. & Meyer, K. F. **Studies on Immunization against Plague. V. Multiplication and Persistence of Virulent and Avirulent *Pasteurella pestis* in Mice and Guinea Pigs.** *J. Immunology.* 1953, Mar., v. 70, No. 3, 245–52, 6 figs. [15 refs.]

The authors describe experiments designed to throw light on the rationale of immunization with living avirulent strains of *Pasteurella pestis*. Groups of mice were inoculated intravenously with suspensions of 48-hour hormone-agar cultures of 7 different avirulent strains; each dose was about 10,000 living bacilli. At intervals 2–4 mice of each group were killed and counts of the number of viable bacilli contained in the spleen and liver were made by spreading suitable dilutions of suspensions of the organs on blood-agar plates. Of special interest were the strains extensively used for human vaccination by Girard (strain EV 76) [this *Bulletin*, 1943, v. 40, 777] and Otten (strain Tjiwidej) [*ibid.*, 1936, v. 33, 365].

Some of the strains, *e.g.*, Tjiwidej, showed a progressive decrease in the number of viable organisms though some could still be found up to the 6th to the 9th day after inoculation. Other strains showed no decrease in numbers for 5–6 days and then progressively became eliminated. Still other strains, *e.g.*, EV 76, increased in numbers for a few days and then diminished rapidly. It is assumed that even when no increase in numbers can be detected there must actually be a considerable degree of multiplication simultaneously with the rapid phagocytosis of the bacilli by leucocytes and tissue cells.

A table shows the results of an experiment in which 5 groups of mice were challenged with a virulent strain of *P. pestis* 14 days after inoculation with different avirulent strains. No deaths occurred in either of the 2

groups of 10 mice protected by strain EV 76 and by a strain isolated by T. H. Chen, respectively. Of the 10 mice protected by the Tjiwidej strain 5 died. Deaths among mice protected by 2 laboratory strains were 3 out of 10 and 2 out of 9, respectively.

The authors suggest that the avirulent strains owe their effectiveness in producing immunity either to their richness in the potent water-soluble envelope antigen (Fraction I) or to their ability to multiply rapidly in the tissues and so to build up a store of Fraction I.

No opinion is expressed with regard to the relative value of the different avirulent strains or of killed virulent-strain vaccines compared with live avirulent vaccines. *John W. D. Megaw*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

Gaud, J. & Chedecal, M. Parasitisme intestinal chez les écoliers de Berguent. [**Intestinal Parasites in Schoolchildren of Berguent, Morocco**] *Bull. Inst. Hyg. Maroc.* 1951, v. 11, Nos. 3/4, 301–11, 2 figs. on 2 pls. [15 refs.]

The authors made a parasitological study of the stools of schoolchildren at Berguent, Morocco, which is situated at 900 metres above sea-level and some 250 km. from the coast. The study is compared with that undertaken 10 years ago by Gaud *et al.* in Fez [this *Bulletin*, 1945, v. 42, 420].

A brief account of the place and its people is followed by a short description of a simple method used for transporting smears for subsequent staining at Rabat. No concentration methods are described.

Tables show the results of the findings in the case of protozoa, for different races, ages and habits. The principal differences in the findings compared with those in the Fez study were the relative infrequency of *E. histolytica*, which was found in 5 per cent. (14 per cent. in Fez) and the frequency of *I. bütschlii*, which was 21 per cent. *Giardia* was also common (32 per cent. compared with 10 per cent. in Fez), and *Chilomastix* was found in 18 per cent. Altogether protozoal parasites were found in 334 of 457 children (73 per cent.). Parasites seemed to be commoner in children under 9 years (as in Fez), and sedentary Muslims seemed more frequently to harbour parasites than did nomadic Muslims; parasites also appeared to be commoner in Jews than in Muslims. In fact, however, the authors point out that statistical analysis of their figures suggests that these interpretations must be made with reserve.

The only helminth parasite found frequently was *Hymenolepis nana* which accounted for 22 of the 32 helminthic infections found.

H. J. O'D. Burke-Gaffney

Ettinger-Tulczynska, R. [**Intestinal Parasites in the Rehovot District before and after Arab Evacuation**] *Harefuah.* Jerusalem. 1953, Feb. 1, v. 44, No. 3 [in Hebrew 59–61. English summary 61.].

The author summarizes in a table the results of stool examinations made in the Rehovot District of Israel between 1946 and 1952. For the first two of these years, there was a large Arab population, but they were evacuated at the time of the setting-up of the State of Israel.

The table shows that most of the intestinal parasites were found more frequently in Arabs, *e.g.*, in 1947 pathogenic amoebae were found in 36 per cent., compared with 9·1 per cent. in Jews. Corresponding figures for *Ascaris* were 3 and 1 per cent., and for hookworms 66 and 1 per cent. Many of the common helminthic parasites decreased after the evacuation of the Arab population, but some such as *Hymenolepis* and *Enterobius* have remained at the same level. There has been a moderate decrease in the incidence of flagellates, but little change in that of pathogenic amoebae; however, the small race of *E. histolytica* became more common after the departure of the Arabs.

In 1950–52, tests showed that 13 to 15 per cent. of food handlers were infected with *E. histolytica*: this figure was about twice as high as that for the general population during those years.

H. J. O'D. Burke-Gaffney

Hoare, C. A. **The Commensal Phase of** *Entamoeba histolytica*. *Exper. Parasit.* New York. 1952, Nov., v. 1, No. 4, 411–27. [60 refs.]

The author summarizes the arguments for and against the theory that *Entamoeba histolytica* is always tissue-invading, and quotes extensively from the large literature on the subject. It would appear from (*a*) observations on man, (*b*) monkey experiments and (*c*) culture of the organism, that *E. histolytica* can live solely on bacteria and other faecal elements; it is obvious that to maintain its existence, the parasite would do better to live in the lumen of the gut and produce cysts, than to live in the tissues as a sterile trophozoite; the incidence of the infection is so high throughout both the temperate and the tropical world that invasiveness (and pathogenicity) would inevitably be manifest clinically—which is not the case in the former. These and other arguments convince the author that the great majority of carriers are healthy, with no gut lesions, the amoebae being "minuta" forms leading a commensal existence in the bowel. *P. C. C. Garnham*

Patel, J. C. **Chloroquine in the Treatment of Amoebic Liver Abscess.** *Brit. Med. J.* 1953, Apr. 11, 811–13.

Eleven patients (9 male, 2 female) with amoebic liver abscess were treated by the author in Bombay during a period of 2 years. *E. histolytica* was found in the stools in 2 cases. When once the diagnosis of liver abscess was established by aspiration of pus, treatment with chloroquine was instituted. Emetine was not given in any case. The dosage of chloroquine diphosphate was 0·25 gm. (0·15 gm. of the base) twice a day. In the first 6 cases it was given for a period of 10 to 12 days; later, after 2 relapses had occurred, it was given for 30 days to the remainder.

The temperature subsided within 72 hours in most patients, and within 48 hours in 5. A lessening of liver tenderness was the first sign of improvement. Apart from mild nausea and dimness of vision in one patient, no toxic symptoms were recorded.

Two patients were readmitted with recrudescence, one 3 months, the other 4 months, after treatment. In both, pus was again aspirated. One died from pulmonary complications. In 4 patients, therefore, treatment for 10–12 days was adequate.

It is suggested that further work should be carried out in order to determine the dosage of the drug and the length of its administration in the treatment of liver abscess. *Philip Manson-Bahr*

Bintari Sumardjo & Lie Kian Joe. **Uni- and Binuclear Cysts, morphologically resembling *Entamoeba polecki* Prowazek, 1912, found in an Indonesian Boy.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1953, Mar., v. 5, No. 1, 1–4, 12 figs.

"(1) Uni- and binuclear cysts, morphologically identical with those of *E. polecki*, were found in the faeces of an Indonesian boy.

"(2) The organism appeared to live as a commensal—as it does in pigs and monkeys—producing no pathological symptoms.

"(3) The number of cysts produced in the faeces varied considerably from day to day.

"(4) A description of the cysts is given."

Cicchini, T. Sindromi varie provocate dalla giardiasi nell'infanzia. [**Various Syndromes Produced by Giardiasis in Children**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1953, Feb., v. 34, No. 2, 99–106. [12 refs.]

The English summary appended to the paper is as follows:—

"The author reports 4 cases of children infested by *Giardia intestinalis*: they developed respectively a clinical picture of angiocholitis, acute appendicitis, Addison's syndrome and an enteric picture simulating fat dyspepsia. Diagnosis was possible through demonstration of the parasite in the faeces.

"The author stresses the necessity of submitting also children to the parasitological examination of faeces in all disorders of the digestive system."

Gondard, L. Supériorité de la prémaline sur la quinacrine et la nivaquine dans le traitement de la lambliase. [**Superiority of Prémaline to Quinacrine and Nivaquine in the Treatment of Giardiasis**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 31–4.

Observations on the efficacy of chemotherapeutic agents against *Giardia* infections have been based, where possible, on the examination of samples recovered by duodenal intubation after gall-bladder stimulation.

Thirty-one patients were treated with nivaquine [chloroquine] the dosage being 3 tablets, each of 0·1 gm., daily for 13 days; 27 of the patients were thus treated once, 2 others twice, and the remaining 2 three times. Of 28 of these patients subsequently re-examined only 15 (53 per cent.) were considered to be cured of their infections by the nivaquine treatment; 2 of those not cured had previously been unsuccessfully treated with quinacrine.

One hundred and five patients with giardiasis were treated with quinacrine [mepacrine] or allied compounds (7 cases). The dosage was 3 tablets, each of 0·1 gm., daily for 5 days; 33 patients had one course, 48 two courses, 14 three courses, 6 four courses, 1 five courses, 2 six courses, and 1 ten courses of this treatment—these figures do not include the further "consolidation" courses of treatment given to those apparently freed of their parasites. Follow-up of 65 of the patients indicated 48 (74 per cent.) of them to have been cleared of their infections.

Forty-one patients with giardiasis were treated with "Prémaline"; this consists of tablets each containing 0·1 gm. of quinacrine and 0·01 gm. of "Rodopréquine," the latter being composed of equal parts of "Rodoquine" and of "Praequine." The dosage was 3 tablets daily on the 1st, 3rd, 5th,

7th and 8th days of treatment. Follow-up of 36 of these patients indicated parasitic cure in all of them, and only one course of treatment was needed to achieve this. There were no side-effects of the treatment.

A. R. D. Adams

HOEKENGA, M. T. **Terramycin Treatment of Balantidiasis in Honduras.** *Amer. J. Trop. Med. & Hyg.* 1953, Mar., v. 2, No. 2, 271–2.

The author refers to the reports of previous workers on the efficacy of terramycin and other antibiotics in the treatment of *Balantidium coli* infections [this *Bulletin*, 1951, v. 48, 156, 471, 738; 1952, v. 49, 868].

He has used terramycin in 10 cases of balantidiasis in a United Fruit Company hospital at La Lima, Honduras. Details are given in a table. The patients were aged 6 to 40 years and all came from banana labour camps, where contact with pigs was close and frequent.

The daily dose of terramycin varied from 0·75 to 2 gm., and it was given for 10 days. The patients were followed up for 3 to 5 months, and 6 to 14 stools were examined in each case after treatment.

All patients responded rapidly to terramycin and stools became negative in 4 days. One boy of 12 relapsed after 3 months, but may have become reinfected, as constant contact with pigs continued after treatment. The only side-effects noted were mild gastric symptoms in 2 patients, and in no case was it necessary to discontinue the drug.

It is concluded that "terramycin obviously is an excellent therapeutic agent against human balantidiasis". *H. J. O'D. Burke-Gaffney*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

GUTZEVICH, A. V. [**Contribution to the Question of the Presence of the Ticks *Ornithodorus* in Yugoslavia**] *Zool. Zh.* Moscow. 1948, v. 27, Pt. 6, 563–4. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1953, Feb., v. 41, Pt. 2, 18.]

During a survey carried out in various parts of Yugoslavia in the first 3 months of 1947, no ticks of the genus *Ornithodoros* were found in Bosnia, Herzegovina or southern Dalmatia, but 105 nymphs of *O. lahorensis* Neum. were taken on and near sheep in a village some 12 miles north-east of the town of Bitol in southern Macedonia at an altitude of about 2,000 ft. The climate in southern Macedonia is much drier than in the other areas inspected. There is no evidence of the occurrence of tick-borne relapsing fever in Yugoslavia, *O. lahorensis* is not a vector of the disease in Central Asia, and no infection was produced in a guineapig on which 15 of the Macedonian nymphs were fed.

SOSNINA, E. F. [**On the Survival of Ticks, *Ornithodorus papillipes* Bir., under the Plaster of Walls of Local Buildings**] *Zool. Zh.* Moscow. 1949, v. 28, Pt. 4, 380–82. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1953, Feb., v. 41, Pt. 2, 20.]

The effectiveness of filling up cracks in native buildings in Central Asia with clay against ticks that may be sheltering in them was investigated in

Tadzhikistan in experiments beginning on 24th September, 1945. Examples of *Ornithodoros tholozani* (Lab. and Mégn.) (*papillipes* (Bir.)) were collected in animal quarters, and some of them were allowed to engorge on a rat. Batches of the fed and unfed ticks, each comprising 1 male and 9 nymphs, were confined in muslin bags and placed in cracks in one of the stone walls of an animal shed, and the wall was then plastered with loess. The bags were removed at intervals ranging from 3 weeks to a little over a year and the condition of the ticks ascertained. The results, which are discussed and summarized in a table, showed that after a year 72·5 per cent. of the engorged ticks and 52·5 per cent. of the unfed ones were still living, 20 per cent. were dead and the rest had disappeared. In the batch of engorged ticks examined after a year, 4 were alive, 2 were dead and 4 had disappeared, the corresponding figures for the unfed batch being 1, 1 and 8. It appears, therefore, that filling up cracks in the walls might prevent ticks from crawling out and attacking man, but does not give complete mortality, at least in a year.

Waterson, A. P. & Wedgwood, J. **Rat-Bite Fever. Report of a Case due to *Actinomyces muris*.** *Lancet.* 1953, Mar. 7, 472–3, 1 fig. [10 refs.]

YAWS AND OTHER TREPONEMATOSES

Lu, Y. C., Yu, K. Y. & Chang, Y. Y. **The Juxta-Articular Nodules of Framboesic Origin: a Report of the First Case in China.** *Chinese Med. J.* Peking. 1953, Jan.–Feb., v. 71, No. 1, 62–80, 2 figs. on pl. [64 refs.]

Guimarães, F. N. Ação da cloromicetina e da dihidroestreptomicina na framboesia tropica. Nota preliminar. [**Yaws treated with Chloromycetin and with Dihydrostreptomycin**] *Hospital.* Rio de Janeiro. 1951, May, v. 39, No. 5, 631–9, 3 figs. [11 refs.]

The success of penicillin, terramycin and aureomycin in the treatment of yaws is acknowledged. The author has made trial of two other antibiotics, chloramphenicol and dihydrostreptomycin, for the same purpose. Five patients received the former, orally, in a course of 10 days, 4 receiving a total of 10 gm., the fifth 20 gm.; 4 were given dihydrostreptomycin also over 10 days, to a total of 10 gm. injected intramuscularly, injections being given twice daily. Clinical cure was obtained within 20 days after treatment started, whichever antibiotic was used. It is suggested that even better results might be obtained from the synergistic action of a combination of antibiotics. *H. Harold Scott*

Rein, C. R. **Laboratory Aids in Mass Treatment Campaigns against Treponemal Diseases.** *Amer. J. Pub. Health.* 1953, Mar., v. 43, No. 3, 273–8.

This is the same as the paper abstracted in this *Bulletin*, 1953, v. 50, 311.

LEPROSY

Gray, J. A. C. **Epidemiology of Leprosy in American Samoa.** *U.S. Armed Forces Med. J.* 1953, Apr., v. 4, No. 4, 585–98, 1 fig. [Refs. in footnotes.]

American Samoa consists of 7 islands with a rapidly increasing population numbered at 18,602 in 1950. They are within sight of the New Zealand mandate of West Samoa. Three family groups are described which were infected with leprosy from West Samoa, and were between them responsible for the infection of 41 out of the 45 recorded cases. The factors favouring the spread of leprosy are the warm, moist climate, the density of the population (244·7 per square mile, but actually much denser as many parts are uninhabited), and the changing social organization as modern conditions infiltrate the old Samoan paternal system. Of the 45 recorded patients, 8 have died; 29 are at the Makogai hospital, the leprosarium in the Fiji Islands, American Samoa being too small a unity to maintain a leprosarium with advantage to the patients; in 3 the disease has become arrested; 1 is at Carville; 3 are treated as out-patients and 1 is unknown. Of the 45 cases, the type is unknown in 10. Of the remaining 35, 18 are given as lepromatous, 14 as tuberculoid, and 3 as uncharacteristic. The small white population has remained unaffected. Leprosy is considered a major public health problem, and steps are being taken to examine contacts of known cases, and schoolchildren. *Ernest Muir*

Gupta, N. P., Mehrotra, T. N., Mangalik, V. S. & Chandy, P. J. **Serological Test for Syphilis. False Positive Reactions in Leprosy.** *Indian J. Med. Sci.* 1953, Jan., v. 7, No. 1, 23–32. [11 refs.]

These authors carried out Wasserman (MRC Method No. 4, using sheep heart antigen), Kahn Standard, Meinicke slide and VDRL slide tests on 263 persons suffering from leprosy; 151 had the lepromatous form and 112 the tuberculoid. In the 263 patients the serum tests for syphilis (STS) results were as follows: positive in all 4 tests 14 (5·4 per cent.); positive in 3 tests 25 (9·5 per cent.); positive in 2 tests 64 (24·3 per cent.); positive in 1 test 92 (35 per cent.) and negative in all tests 68 (25·8 per cent.). The expression " positive " included " all weak and doubtful positives ".

The percentage of false positive reactions with each test was: WR 56·5, VDRL 36·5, Kahn 25 and Meinicke 14.

Heating of test sera to 65°C. for 4 minutes tended to reduce the number of false positive reactions, with the WR from 50 to 2 and with VDRL from 50 to 5; 6 positive syphilitic control sera were not reversed by heating. The duration of leprosy and treatment had no effect on STS. In general, sera from lepromatous patients gave a higher percentage of positive reactions than those from tuberculoid ones. *T. E. Osmond*

Hsiao, S. C. **Ear, Nose and Throat Manifestations in Leprosy: an Observation of Seventy Three Cases.** *Chinese Med. J.* Peking. 1952, July–Aug., v. 70, Nos. 7/8, 289–98.

An analysis is given of the ear, nose and throat lesions in what are listed as 34 neural and 39 lepromatous cases of leprosy. " For the lack of facilities bacteriologic examination was not done." The astonishing statement is made that there was thickening of the tympanic membrane in 14 of the neural and 15 of the lepromatous cases, while cases of catarrhal or

suppurative otitis media were comparatively uncommon. Nerve deafness was more common in the neural type, but it is suggested that this may be due not to affection of the auditory nerve but " to degeneration of Corti's organ or the ganglion spirale cells in the inner ear as a result of chronic illness or deficiency of vitamins ". Most of the other descriptions are similar to those given by other workers. *Ernest Muir*

HELMINTHIASIS

Hales, D. R. & Welch, A. D. **A Preliminary Study of the Anthelmintic Activity of Cyanine Dye No. 715 in Dogs.** *J. Pharmacol. & Exper. Therap.* 1953, Mar., v. 107, No. 3, 310–14.

" Various cyanine dyes, particularly one termed No. 715, given orally, exerted appreciable vermicidal activity in the chemotherapy of ascariasis, trichuriasis, and ancylostomiasis in the dog, but were of no value in the treatment of canine tapeworm infestations.

" The chief toxic signs associated with oral therapy with No. 715 were: a) anorexia and occasional vomiting during the first 6 hours after ingestion of the drug, and mild diarrhea of a transient nature beginning 12 to 16 hours after treatment; b) a mild renal tubular change of a reversible nature when the drug was given in the therapeutic dosage schedules described. With frequent administration of large doses, these renal changes were more pronounced."

Zahra, A. **Some Notes on the Incidence of Schistosomiasis in the Southern Cameroons.** *West African Med. J.* 1953, Jan.–Feb.–Mar., v. 2 (n.s.), No. 1, 26–9, 1 map & 1 fig.

Surveys done in 1949 and 1951 in the Cameroons have shown that *Schistosoma haematobium* is endemic in the villages of Barombi Mbo and Barombi Kotto. Both these villages are in the Kumba division and are the only foci of schistosomiasis so far reported in the British Cameroons, excepting Adamawa and Bornu Provinces.

Barombi Mbo Lake (Elephant Lake), the largest crater lake in the Cameroons, has a surface area of 450 hectares and is a beauty spot. On the south side of it is Kumba station and this side is much frequented for swimming. On the north side of it is Barombi Mbo village. No snails or vegetation were found on the lake near Kumba station and the only cases of schistosomiasis in Kumba people " in the past years " have been in people who have passed through Barombi Mbo village and in one European who had swum across the lake to the entrance of this village. At the entrance to this village *Bulinus* infected with cercariae with forked tails were found and there is vegetation here. In Mbo village a survey showed " a total incidence of 91 per cent. *S. haematobium* " with " approximately 100 per cent. infection rate in the 5–29 age groups ". The main occupation of the villagers is fishing.

Barombi Kotto Lake (Lake Rickard) is shallower and algal growth gives it a green colour. *Bulinus* is easily found in it and snails of this genus are numerous near the beaches of Kotto Island and they are infected with cercariae with forked tails. In Barombi Kotto a total incidence of

schistosomiasis of 72 per cent. was found on the island, where fishing is the main occupation, with an infection rate of 83 to 93 per cent. in the 5–29 age groups. In the small "strangers' quarter" of Barombi Kotto, the inhabitants of which are farmers, the total incidence was 21 per cent. In Barombi Kotto New Town, a strangers' settlement 2½ miles from the lake, whose inhabitants are rice farmers who rarely go to the lake, only 1 of the 67 people examined had schistosomiasis.

For control the author suggests simultaneous mass treatment, sanitation and education in the use of it and destruction of the snails. *G. Lapage*

DE MEILLON, B., STOFFBERG, N. & LURIE, H. I. **Urinary Bilharziasis on the Witwatersrand.** *South African Med. J.* 1953, Mar. 28, v. 27, No. 13, 257–8, 1 fig.

In an area in the northern environs of Johannesburg traversed by a number of small streams, sporadic cases of urinary schistosomiasis have occurred. There have also been some cases of dermatitis after bathing in a local river, the Klein Jukskei. The area is evidently popular as a bathing resort at week-ends, but local inhabitants on the whole appear to be unaware of the presence of the disease and its risks.

Snail surveys have shown that at times as many as 40 per cent. of the *Physopsis* in the area may be shedding schistosome cercariae, but the only natural infection so far identified in them has been that with *S. bovis*. However, under laboratory conditions, the authors have infected *Physopsis* from the Klein Jukskei with *S. haematobium* experimentally.

The area is clearly a dense focus of *S. bovis* infection and as the authors have found that the miracidia of this parasite are very lethal to local *Physopsis*, the possibility suggested itself that this might prove to be a basis for a method of biological control under certain field conditions.

To determine whether the local *S. bovis* could infect man, a survey of children in the area was proposed, and its scope later extended. The authors now report the examination of single specimens of urine from 860 children aged 5 to 9 years and 948 aged 10–16 years, in 4 European and 3 Bantu schools situated in the area. The disposition of the schools in relation to the river Jukskei and the small streams is shown on a map.

Figures for boys and girls are given separately. As might be expected, infection was greatest in boys of 10–16 years.

In those schools situated near the Klein Jukskei river, the infection rate [presumably with *S. haematobium*] averaged 10 per cent. in European children and 20 per cent. in Bantu children of 10–16 years. Few or no infections were found in children of schools farther away or near streams where *Physopsis* was not shown to be present.

It is recorded that *S. bovis* was found only once, as a pure infection in a European child: this will be fully reported later. It is concluded that human beings are not readily susceptible to *S. bovis* infections. [For an account of a European case of *S. bovis* infection in the Lake Victoria region of Uganda, see this *Bulletin*, 1951, v. 48, 1010.]

H. J. O'D. Burke-Gaffney

LE GAC, P., SAUERMANN, M. & N'KOA, A. Mise en évidence pour la première fois en Oubangui-Chari de *Schistosoma intercalatum* (Fisher, 1934). [**First Record of** *S. intercalatum* **in Oubangui-Chari**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 15–16.

The authors found terminal-spined ova resembling those of *S. haematobium* in the stools of an African child who had never left Bangui. Vesical

schistosomiasis has never been recorded there and no ova were found in the child's urine. Many *Physopsis*, but no *Bulinus*, were found in ponds where the child frequently paddled. It is considered that the ova were not those of *S. bovis* (which does occur in cattle in Bangui), because man is not infected with cercariae of this species [but see this *Bulletin*, 1951, v. 48, 1010]. It is therefore concluded that the ova were those of *S. intercalatum*, hitherto unrecorded in the area. [It is remarkable that only a single case was found: no details or illustrations of the ova are given.]

H. J. O'D. Burke-Gaffney

Jones, M. F. & Newton, W. L. **The Cercaricidal Efficacy of Ozone.** [Research Notes.] *J. Parasitology.* 1952, Feb., v. 38, No. 1, 88–9.

In the course of their studies on ozone as a cysticidal agent for *E. histolytica* cysts [this *Bulletin*, 1950, v. 47, 468], the authors also examined the effect of this agent on schistosome cercariae.

Cercariae of *S. mansoni* were exposed to concentrations of ozone varying from 0·1 to 1·3 p.p.m. in chlorine-free tap water at 27° to 29°C. The action of ozone was stopped by means of N/100 sodium thiosulphate.

With 1·1 p.p.m., residual determinations of ozone at 3, 5 and 10 minutes showed 0·9, 0·7 and 0·4 p.p.m. The cercarial concentration was 50 per ml. No motility of cercariae was found after an exposure of 1 minute or at any time up to 10 minutes thereafter.

In other experiments with cercarial concentrations of 2 to 3 per ml. and a 1-minute exposure, no cercariae survived the action of 1·3 to 0·9 p.p.m. ozone: after 0·7, 0·6, 0·5 and 0·3 p.p.m., cercariae either were killed within 1 minute or died within 30 minutes. At 0·2 and 0·1 p.p.m., they were not killed within 1 minute, but were dead within 30 to 60 minutes. In a single test, cercariae exposure to 0·1 p.p.m. ozone were alive after 2 minutes, but were killed after 5 minutes. Activity of cercariae persisted in untreated control water. The results seem to indicate that ozone is an effective cercaricide in fairly low concentrations. *H. J. O'D. Burke-Gaffney*

Oliver-González, J. **Intradermal Reactions to Schistosome and Filaria Antigens in Patients before and after Treatment of the Parasitic Infections.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 79–84.

Patients infected with *Schistosoma mansoni* were skin-tested with 1 : 10,000 dilutions of extracts of dried and powdered (1) cercariae of *S. mansoni*; (2) adults of *Fasciola hepatica* and *Pneumoneces medioplexus* (from the frog). Culbertson *et al.* [this *Bulletin*, 1947, v. 44, 924] have shown that *F. hepatica* and *P. medioplexus* contain an antigenic substance which is apparently common to all trematodes. The skin-tests were done (a) before treatment, chiefly with fouadin, although 10 patients were given urea stibamine; and (b) for periods up to 4 years after it.

The cercarial antigen gave positive reactions in 95·5 per cent. of the 246 patients tested with it and tests done up to 4 years after treatment gave results not significantly different. With the antigens made from *F. hepatica* and *P. medioplexus*, on the other hand, the percentage of positives decreased greatly after treatment. Thus the antigen made from *F. hepatica* gave positives in only 51·9 per cent. of the 231 patients tested before treatment; but 4 years after treatment positive results were only 10·6 per cent. The corresponding figures with *P. medioplexus* antigen were 93·8 and 28·9 per cent.

The author considers that schistosome eggs in the liver and other organs may continue to sensitize the host for short periods after treatment has killed the adult worms; and that positive intradermal reactions may be due to infection with a small number of adult worms which cannot be detected by faecal examinations or by biopsy.

Patients infected with circulating microfilariae of *Wuchereria bancrofti* were skin-tested with 1 : 10,000 dilutions of antigen made from (1) adult *Dirofilaria immitis* and *Litomosoides carinii*, and (2) concentrated microfilariae of *W. bancrofti*. Positive reactions to these 3 types of antigen were obtained in more than 90 per cent. of the 68 patients tested before treatment either with hetrazan or with neostibosan and other antimonial compounds. More or less the same result was obtained 2 years after this treatment.

G. Lapage

Komiya, Y., Yokogawa, M., Chichijo, K., Nishimiya, H., Suguro, T. & Yamaoka, K. **Studies on Paragonimiasis in Shizuoka Prefecture. 1. An Epidemiologic Survey of *Paragonimus westermani* along the Banks of the Kano River.** *Japanese J. Med. Sci. & Biol.* 1952, Oct., v. 5, No. 5, 341–50, 1 fig.

The authors studied the incidence of human infection with *Paragonimus westermani* [*sic*] in the farming populations of 6 centres along the Kano River, in Japan, together with the infection of the first intermediate host, the crab *Eliocheir japonicus* and also the methods of infection of man. A comparison of the recovery of eggs from sputa and stools will be reported separately.

Random selections, including all age-groups and both sexes, were made from the 6 populations, clinical symptoms being ignored. Single stools were collected and examined by the AMS III centrifugation technique of Hunter *et al.* [this *Bulletin*, 1948, v. 45, 623]. A table shows the results.

Of the 6 villages surveyed, more than 10 per cent. of the people examined were infected with *P. westermanni* in the villages of Hida, Tsukamoto and Nitta; in the other villages about 5 per cent. were infected. With the exception of Hida the differences of infection in relation to sex and age were not statistically significant. The intermediate hosts were the crabs *Eliocheir japonicus* and *Cambaroides clarki*. Both were infected, but the latter only lightly and sparsely and this species is rarely eaten. During a year 220 out of 304 specimens of *E. japonicus* (72 per cent.) were found to be infected and there appeared to be a seasonal peak of infection from September to October. The maximum number of metacercariae found in a single crab was 1,304 and the minimum number 1, the average number being 54·4 in male crabs and 86·1 in female crabs.

A thorough examination of food consumption and cooking practices was made, because inhabitants of the Kano River district are especially fond of *E. japonicus*. The people of the villages of Nitta, Hida and Tsukamoto who were questioned had all eaten crabs during the last 10 years, but most had not eaten them during the last 3 years. Usually the crabs had been eaten in the autumn and 4 or 5 times a year. The crabs are eaten as (1) crab soup, which is eaten by most of the people surveyed and is made by crushing the crab and cooking the pieces and expressed juices for 20 to 30 minutes; (2) by boiling for 20 to 30 minutes; (3) by frying the crabs in oil; (4) by baking them over a fire. Boiling, frying and baking are only occasionally used. The eating of raw crabs was not noted in the district.

The authors concluded that the cooking usually employed made it unlikely that infection was due to inadequate cooking. They suggest that when crab soup is made, metacercariae may cling to the knife used to chop up the crab, to the bamboo basket in which the crab meat is put, and to the hands of the cook, and that these metacercariae may then be transferred to the mouth by the hands or by other foods. They found 372 metacercariae in the juice filtered from crabs prepared in this way, 2 on the knife used, 3 on the cook's hands, 25 in the bamboo basket into which the crab-meat was put, 14 on the chopping block used and 1 on the table. Often vegetable pickles and spices are prepared on the chopping block immediately after it had been used for making crab soup. *G. Lapage*

Ross, J. A., Kershaw, W. E. & Kurowski, A. C. **The Radiological Diagnosis of Paragonimiasis with Report of a Case.** *Brit. J. Radiol.* 1952, Nov., v. 25, No. 299, 579–83, 5 figs.

The case here reported is that of a Chinese seaman who until he became a sailor 8 years previously had lived near Shanghai. He had often eaten crabs and crayfish, and intermittently during the previous 6 months had had cough with bloodstained sputum. Physical examination revealed no abnormality in the chest or elsewhere, but fluke eggs were found in the sputum.

Routine X-ray films of the chest showed a small opacity confined to the base of the right upper lobe, but tomographic films showed that the opacity was caused by several contiguous small cavities resembling a bunch of currants. The interlobar pleura was thickened and a little elevated owing to fibrosis and de-aeration associated with the cavitation. It is assumed that the cavities were produced by several flukes and not by bronchiectasis. This view is supported by the fact that they were localized and at the periphery of the lobe.

It is suggested that the localization of the multiple lesions in this case resulted from several infective metacercariae being swallowed on a single occasion, since repeated infection would probably have produced scattered lesions.

[Few studies have been made of the radiological appearances of the lesions in paragonimiasis and this is a valuable contribution to knowledge on the subject. See also this *Bulletin*, 1953, v. 50, 131.] *A. W. Woodruff*

Alicata, J. E. **Human Fascioliasis in the Hawaiian Islands.** *Hawaii Med. J.* 1953, Jan.–Feb., v. 12, No. 3, 196–201, 1 fig. [15 refs.]

The author gives an account of the 19 cases of human infection with *Fasciola hepatica* and *F. gigantica*, reported from the Hawaiian Islands. Three of these cases have not been previously reported. Histories and some details of the symptoms of most of the patients are given, together with an account of the life histories of these two species of fluke. It is known that both occur in cattle in the Hawaiian Islands. *F. gigantica* is, however, the commoner of the two in cattle, only one specimen of *F. hepatica* having been identified, and the author suggests that *F. hepatica* has been introduced to the islands only recently. Two of the flukes recovered from man and formerly reported to be *F. hepatica* were found by the author to be *F. gigantica*. He concludes from an examination of the records of the human cases that all were probably infections with *F. gigantica*. He adds that, if this is so, there have been in the Hawaiian Islands more cases of infection with this species of fluke than anywhere else, because only 3 cases

have been reported outside Hawaii, *i.e.*, from Africa, Tashkent and French Indo-China.

The author discusses the infection of animals in the Hawaiian Islands with flukes. Wild hogs are infected as well as cattle and may help, together with infected cattle, to contaminate water in which watercress is grown, with the consequence that lymnaeid snails are infected. Human infection by eating infected watercress has been suggested, but has never been proved. Infection of animals may also occur by drinking water on which encysted cercariae are floating, and human infection in this manner is possible, but is less likely than by eating infected vegetation. *G. Lapage*

Lallemand Carpio, A. & Gasalla Chacón, J. M. Reacciones de Wassermann inespecíficas en líquido cefalorraquídeo a propósito de un caso de cisticercosis cerebral. [**Non-Specific Wassermann Reactions in the Cerebrospinal Fluid in a Case of Cerebral Cysticercosis**] *Med. Colonial.* Madrid. 1953, Mar. 1, v. 21, No. 3, 248–68, 1 diagram & 6 figs. [Numerous refs.]

See also p. 646, Trincao, Gouveia, Franco and Parreira, L'ionisation du fer par le suc gastrique dans l'anémie de l'ankylostomiase. [**Ionization of Iron by Gastric Juice in Hookworm Anaemia**]

Mongelli Sciannameo, N. L'olio cloroformico nella disinfestione dall' Ankylostoma duodenalis. [**Chloroform Oil (Chloroform + Castor Oil) in the Treatment of Hookworm**] *Ann. d. San. Pubblica.* Rome. 1952, Nov.–Dec., v. 13, No. 6, 1561–7, 1 fig. [32 refs.] English summary (7 lines).

This is a plea for the use of a 10 per cent. mixture of chloroform in castor oil as a most suitable anthelmintic in mass treatment of hookworm disease, more especially in rural areas where the full intelligent co-operation of the community which has to be treated is not easily obtainable. A dose of 3–5 gm. of chloroform in 30–40 gm. of castor oil is recommended for an adult and it is advisable that the mixture be more or less freshly prepared as some of the chloroform may evaporate with keeping.

This remedy has little toxicity and may be repeated at intervals of 3–4 days until complete disinfestation has been achieved. It is claimed that it can be given to children of all ages, in severe anaemia and in the presence of various pathological conditions which contraindicate the use of many other anthelmintic drugs. Chloroform oil, the author states, is contraindicated only in cases of extreme debility. *J. Cauchi*

Sadun, E. H. & Vajrasthira, S. **Studies on Intestinal Parasitic Infections in Cholburi Province (Thailand).** *Amer. J. Trop. Med. & Hyg.* 1953, Mar., v. 2, No. 2, 286–97, 2 figs. & 1 map.

"A study was made in Cholburi Province, Thailand, to correlate parasitic infections with the general health status. Stool, blood, urine, and physical examinations were done on 387 school children and 60 adult government officials in urban areas. In addition, stools of 219 people from rural areas were examined for helminths.

"In the urban population, *Ascaris* was the prevalent parasite in both adults and children. In the rural population, hookworm infection predominated at all ages. In all the places studied, there was a gradual increase in incidence of hookworm and a decrease in incidence of *Ascaris* infection up to 14 years of age. An increase with age in number of hookworm was also found by egg-counts made on a representative sample.

"Children with positive stools had a mean lower height and weight than those found to be negative. The differential leucocyte count showed

no consistent differences except for a marked eosinophilia in all types of helminth infection. Scabies, trachoma, ear and throat infections were common among children but virtually absent among adult provincial officers. No obvious relationship was observed between parasitic infections, oral temperature, pulse rate, respiration rate and blood pressure."

i. Takeyama, O. [**Influence of Human Urine upon the Development of the Eggs of** *Ascaris lumbricoides* **(Report II)**] *Osaka Daigaku Igaku Zassi.* [*Med. J. Osaka Univ.*: Japanese Edit.] 1952, Dec., v. 5, No. 2, 201–10. English summary (9 lines).

ii. ——. [**Influence of Human Urine upon the Development of the Eggs of** *Ascaris lumbricoides*, **with special reference to its Ovicidal Action (Report III)**] *Osaka Daigaku Igaku Zassi.* [*Med. J. Osaka Univ.*: Japanese Edit.] 1952, Dec., v. 5, No. 2, 211–21. [19 refs.] English summary.

i. The effect of urine on the development of *Ascaris* eggs varied with the type of urine. Indicanuria had a remarkable lethal effect. The injurious effect of urine was found to be proportional to the rise in the specific gravity, but no such relationship was found in the case of the *p*H.

ii. Ammonia in urine in normal concentrations did not interfere with the development of *Ascaris* eggs, but the ovicidal action of uraturia, indicanuria and of some normal urines was shown to be due to the ammonia present. It was found that a urea concentration in urine of 1·0 gm. per 100 cc. or more was lethal to the eggs. *H. J. O'D. Burke-Gaffney*

Etter, L. E. & Cross, L. C. **Roentgenographic Signs of Intestinal Parasitic Infestation. A Case Report.** *U.S. Armed Forces Med. J.* 1953, Apr., v. 4, No. 4, 599–601, 3 figs.

In an X-ray examination of a soldier from Korea with a shell fragment in the abdomen, a filiform collection of barium was seen in the left lower abdominal quadrant. This suggested barium in the intestinal tract of a worm. Later skiagrams revealed a coiled linear filling defect in the barium-filled small bowel. It is suggested that such a combination is probably diagnostic of the presence of an intestinal parasite. In this case an *Ascaris* was passed after anthelmintic treatment.

Nemec, R. & Micka, F. Ileus z askaridosy. [**Ileus Caused by Ascaris**] *Časopis Lékařů Českých.* Prague. 1953, Apr. 10, v. 92, No. 15, 408–9.

Report of a case in Czechoslovakia.

Augustine, D. L. **Filariasis in Tropical Asia.** *J. Trop. Med. & Hyg.* 1953, Apr., v. 56, No. 4, 75–82, 2 figs. [28 refs.]

A general account and review of the literature.

Iyengar, M. O. T. **Filariasis in the Maldive Islands.** *Bull. World Health Organization.* Geneva. 1952, v. 7, No. 4, 375–403, 11 figs.

The Maldives are coral islands scattered over a long narrow belt in the Indian Ocean to the south-west of Ceylon.

They consist of 19 atolls of different sizes, each containing numerous islands, and separated from one another by stretches of ocean. There are over 2,000 islands of the Maldive archipelago with a total area of 115 sq. miles. In nearly 90 per cent. of the islands the subsoil water is saline or brackish, and they are not habitable; in fact, only 213 are inhabited.

The rainfall is heavy, the annual precipitation being about 100 inches in northern atolls, and 150 inches in the southern group. The climate is tropical-oceanic; the temperature in the shade never drops below 70°F.

and rarely rises above 90°F.; atmospheric humidity is high, rarely falling below 70 per cent. The total population is 82,000; the people are of Islamic faith and are engaged in fishing and coconut farming.

Several villages have a high malarial endemicity, and endemic filariasis occurs in all the inhabited islands of the southern atolls.

Early in 1951 a WHO team studied filariasis in the islands. The number of persons examined in different villages ranged from 20 per cent. to 50 per cent. of the population. In all, 34 islands and villages were visited.

Filariasis is endemic in the 3 southern atolls, Haddumatti, Suvadiva and Addu. In other atolls it is either absent or is not a serious problem. Suvadiva has the highest incidence, with an average endemicity rate of 40·1 per cent.

Night bloods of 3,828 persons were examined; 685 were positive for microfilariae, giving a gross infection rate of 17·9 per cent. Average filarial disease rates, filarial infection rates and filarial endemicity rates [percentage of those with filarial infection or disease or both] in these 3 atolls were:—

Atoll	Total population	Filarial disease rate per cent.	Filarial infection rate per cent.	Filarial endemicity rate per cent.
Haddumatti ...	3,646	13·1	26·1	36·0
Suvadiva	9,767	24·3	18·9	40·1
Addu	5,423	8·8	14·1	21·5

In 3,950 persons examined, 939 cases of filariasis were recorded, as follows:—

	Women	*Men*
Number examined	1,985	1,965
Number with filariasis	388	551
Elephantiasis—		
one leg	178	80
both legs	196	53
one or both legs and one or both arms	14	3
one or both legs with hydrocele and elephantiasis of scrotum		151
leg, arm and scrotum		15
leg, scrotum and penis		6
leg, arm, scrotum and penis		4
scrotum, or hydrocele		236
scrotum and penis		3

Filarial infection in the Maldives is due to *Wuchereria bancrofti*. The microfilariae exhibit characteristic nocturnal periodicity with a high incidence in the peripheral blood between 21.00 and 3.00 hours at night.

The relationship of filarial infection to filarial disease follows the rule observed elsewhere in the sense that with the onset of signs of filarial disease, demonstrable filarial infection (presence of microfilariae in the peripheral blood) progressively diminishes. Consequently the incidence of

filarial infection was much lower among persons with filarial disease examined in this study than among those without, as shown below:—

	Number examined	Number positive for microfilariae	Infection rate per cent.
Persons with filarial disease ...	817	103	12·6
Persons without filarial disease	3,011	582	19·3

Elephantiasis of the leg was recorded in two children, a boy and a girl, aged 8, and in several others between 10 and 16. Microfilariae were found in a girl of 4.

The filarial disease rate showed a progressive rise in the successive age groups, rising from zero in the 2–5-year age-group to 1·5 per cent. in the 6–10 age-group. In the higher groups the curve rose rapidly, reaching 44 per cent. between 40 and 50 years and indicating the increasing liability to the disease with age or period of exposure to endemic conditions.

Filarial infection occurred at a much earlier age than filarial disease: it was 9·1 per cent. at 2–5 years and showed a rise with increase in age up to the 21–30-year age-group, but after that did not alter. This is due to disappearance of demonstrable filarial infection following the onset of filarial disease, as has been noted above.

The filarial endemicity rate, however, showed progressive rise with age, indicating that the chances of developing the infection or the disease should increase in proportion to age.

Segregation of cases of elephantiasis is practised in the belief that the disease is contagious. There is a popular superstition that even to walk on ground trodden on by an elephantoid foot will bring on the disease. According to local belief only elephantiasis of the leg is contagious in this manner.

To determine the vectors of filarial infection, 1,881 mosquitoes from dwelling-houses, comprising 9 species were examined. *Culex fatigans*, *Anopheles tessellatus*, *C. sitiens*, *C. tritaeniorhynchus*, *Aëdes albopictus* and *Aëdes aegypti* were found naturally infected.

In *C. fatigans* the natural infection rate was 24·8 per cent. (1,729 examined). In experimentally infected insects it was 86 per cent. The final infective phase was reached in 12–13 days.

In *A. tessellatus* the natural infection rate was 18·2 per cent. (22 examined). In experimentally infected insects it was 88·2 per cent. The filarial larvae underwent normal development.

In the other species mentioned arrested developmental forms were demonstrated.

The observations indicate that *C. fatigans* and *A. tessellatus* are efficient vectors of *W. bancrofti* in the Maldives. The former mosquito is the vector of primary importance because of its ability to breed in large numbers, thus producing a high density of adult prevalence. *A. tessellatus*, though an efficient vector, does not breed in large numbers: in the absence of *C. fatigans* it does not appear to cause endemic filariasis. Villages with high filarial endemicity have a high incidence of *C. fatigans*: the natural infection rate in this insect varies directly with the local endemicity rate.

As a rule filariasis in S.E. Asia is restricted to urban areas with high density of population and a large sullage output, favourable to breeding of *C. fatigans* and establishment of endemic filariasis. Maldive villages are rural in character, and the presence of endemic filariasis there is due to

man-made conditions. It is, in fact, restricted to villages with step-wells, but breeding of *C. fatigans* is also conditional on the amount of organic contamination in them. Climatic conditions are such that transmission of filarial infection is possible throughout the year. The number of ordinary wells in each village is large; there is one almost to every house and this forms the only source of supply of fresh water for drinking and for domestic purposes.

The parapets of the wells should be repaired and the wells themselves provided with close-fitting lids. All those in disuse should be filled in. Step-wells should be abolished. In this way, the author suggests, the vectors may be controlled and the spread of the disease restricted simply and economically. *Philip Manson-Bahr*

Fain, A. Simulies nouvelles du Ruanda-Urundi. [**New Species of** *Simulium* **in Ruanda-Urundi**] *Rev. Zool. Bot. Africaines.* 1950, v. 43, Nos. 1/2, 101–23, 29 figs. Simulies d'elevage et de capture du Ruanda-Urundi. [**Laboratory-Bred and Naturally Captured** *Simulium* **from Ruanda-Urundi**] *Ibid.*, Nos. 3/4, 228–39. [38 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1953, Feb., v. 41, Pt. 2, 29.]

These papers deal with species of *Simulium* collected in Ruanda-Urundi by the author in 1948 and 1949. The first comprises descriptions of 8 new species and 2 new varieties. In the second, brief notes are given on the habits of 17 previously described species (one of them represented by two varieties and one by a variety other than the typical one) together with records of the localities in which they were collected. Five of these species were taken as adults as well as being reared from pupae; the others were reared from pupae only. Females of *S. damnosum* Theo. attacked man in one locality at an altitude of 2,500–3,000 ft. but were never observed to do so at altitudes of more than 5,000 ft. It is concluded that this species is completely adapted to animals at high altitudes in Ruanda-Urundi, but the reason is not known. No cases of onchocercosis have been diagnosed on the plateaux of Ruanda-Urundi, but 2 carriers of *Onchocerca volvulus* were found among some 50 fishermen examined near the mouth of the Ruzizi.

Wanson, M. & Lebied, B. Un *Simulium* nouveau du Kwango *Simulium renauxi* nova species. [*Simulium renauxi*, **a New Species from the Kwango Region, Belgian Congo**] *Rev. Zool. Bot. Africaines.* 1950, v. 43, Nos. 3/4, 309–14, 4 figs.

See this *Bulletin*. 1951, v. 48, 826.

See also p. 658, Dalmat, **Longevity and Further Flight Range Studies on the Blackflies (Diptera, Simuliidae), with the use of Dye Markers.**

Gibson, C. L. & Burch, T. A. Estudios preliminares sobre la infectividad de microfilarias de *Onchocerca volvulus* que reaparecen después del tratamiento con Hetrazán. [**Infectivity of** *Onchocerca volvulus* **Embryos which reappear after Hetrazan Treatment**] Reprinted from *Rev. Colegio Méd. de Guatemala.* 1951, July, v. 2, No. 3, 63–6. English summary.

Soon after receiving hetrazan, patients infected with *O. volvulus* no longer show microfilariae in the skin, but after an interval of 2 months or so the embryos begin to reappear and after 6 months practically all the patients show living microfilariae in biopsy of the skin.

In malaria, say the authors, though gametocytes at first disappear after treatment with certain drugs, when they reappear they are no longer

infective to mosquitoes. The authors have set out to determine whether this holds good for embryos of *O. volvulus*. Four patients found positive before treatment with hetrazan (starting with 1 mgm. per kgm., daily, and increasing to 8 and even 12 mgm., and a total of 111 to 329 mgm. per kgm.) were negative immediately after treatment. In 1 to 4 months, patients 1, 2 and 4 were again positive, and after 5 to 8 months, 1, 2 and 3 were positive; No. 4 was not examined. Three species of *Simulium* were allowed to feed on these patients 9 months after the end of treatment, *S. metallicum*, *S. ochraceum* and *S. callidum*. Development of "sausage" forms duly occurred in them just as in those feeding on control patients who had not had any treatment.

This confirms what had been previously stated, that hetrazan does not always *cure* human onchocerciasis [see this *Bulletin*, 1949, v. 46, 855], and the authors conclude that since it does not prevent the production of infective embryos, "it is of no value from the point of view of prophylaxis of the disease, unless treatment is repeated every few months".

H. Harold Scott

McFadzean, J. A. **Immunity in Filariasis of Experimental Animals.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 85–94. [17 refs.]

During experiments *in vitro*, infective larvae of *Dirofilaria repens* and of a new *Dirofilaria* of monkeys were removed from mosquitoes and placed in the serum of rabbits which had been immunized with *Dirofilaria* antigen. No precipitates formed on the larvae, and the serum did not kill them (exposure up to 1 week). Similar experiments were performed with the adult worms of *Litomosoides carinii*, with correspondingly negative results. The rabbit antisera were also without harmful effect on microfilariae of *Litomosoides* at 37°C. No adhesion reaction [as described by Pandit *et al.*, this *Bulletin*, 1930, v. 27, 989] could be demonstrated between microfilariae and leucocytes in the presence of immune serum.

During experiments *in vivo*, 2 cotton rats infected with *L. carinii* were treated with 9 daily doses of immune rabbit serum; no significant action upon the adult worms or microfilariae could be demonstrated. Ten uninfected rats were given repeated injections of *D. immitis* antigen to immunize them, and they were then exposed to mites carrying *L. carinii*; the rats became infected as readily as the controls did. Three infected rats were given repeated injections of *D. imitis* antigen, but there was no evidence of injurious effect upon the adult worms or the microfilariae.

Skin tests were performed on the infected animals available with antigens of *D. immitis* and *L. carinii* in dilutions of 1:2,000 and 1:8,000, the volume being 0·05 cc. Good weals were produced in 3 dogs infected with *D. repens*, but the smallest weal in the infected animals was no larger than the largest weal in 3 control uninfected dogs. So there is some overlapping of the two groups. In monkeys and in rabbits it was not possible to produce a well-defined weal, presumably because their skin is too thin. A slight indication of the presence of antibodies in the immunized rabbits could be produced by testing for the Prausnitz-Kustner reaction. The weals produced by antigens were compared with those produced by injection of 0·05 cc. of 1:1,000,000 histamine intradermally. In dogs good weals could be produced, but those in monkeys and rabbits were very poorly defined (as was the case when antigens were injected).

A general review is given of immune reactions which can be demonstrated in filarial infections; these are usually small and mild. An important general principle is enunciated, *viz.*, that the more perfect the adaptation of the

parasite to its host, the less is the immune response which it provokes. Filarial worms are comparatively well adapted to their hosts, so it is not surprising that immune reactions to them are usually so limited in extent. The 3 experimental infections studied during the present work are non-pathogenic, *i.e.*, they do no damage to the host and the host develops no inflammation round them. Accordingly, it was only to be expected that immune responses to them would be difficult to elicit. *F. Hawking*

Guillon, P. Sur un syndrome hématologique complexe avec splénomégalie dû à la trichocéphalose. [**Complex Haematological Syndrome and Splenomegaly Attributed to *Trichuris* Infection**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 39–43.

A man of 45 had been increasingly asthenic and losing weight for several months. He also suffered from gastro-intestinal upsets, attacks of fainting and of purpura. The spleen was large, soft and painless. There was a slight anaemia, but the striking haematological feature was the delay in the bleeding and coagulation times (27 minutes). The patient was treated with calcium and vitamins but the delayed coagulation time persisted. Radiotherapy was started but abandoned, and eventually stool examination revealed the presence of a heavy infection with *Trichuris*. Two courses of thymol were given at a fortnight's interval: improvement was rapid and after the second course, few ova were found in the stool. After 4 months the patient was clinically cured. Thereafter a course of thymol was given every 3 months for a year and then every 6 months for 3 years. After 9 months the stools became negative, but 2 years later a few ova could still be found. The patient is now in good health. The author attributes the syndrome to the massive parasitic infection, and bases this opinion particularly on the grounds of the spectacular therapeutic results. In discussion, Brumpt was unable to support this view from his own experience and suggested that the presence of the worm infection and the enlarged spleen appeared to be fortuitous. *H. J. O'D. Burke-Gaffney*

Weston, J. K., Thompson, P. E., Reinertson, J. W., Fisken, R. A. & Reutner, T. F. **Antioxyurid Activity, Toxicology and Pathology in Laboratory Animals of a Cyanine Dye [6-Dimethylamino-2-[2-(2,5-Dimethyl-1-phenyl-3-Pyrryl) Vinyl]-1-Methyl-Quinolinium Chloride].** *J. Pharmacol. & Exper. Therap.* 1953, Mar., v. 107, No. 3, 315–24.

Compound 715 was effective against several helminthic infections of animals, including pinworms. There was, however, evidence of gastro-intestinal irritation and mild degrees of kidney and liver damage. Nevertheless, it is suggested that compound 715 " seems worthy of serious trial in oxyuriasis ". In such a trial enteric coating might be desirable. The authors, however, add that " it is hazardous to predict the possible clinical usefulness of No. 715 ".

Beck, J. W. **Xenodiagnostic Technic as an Aid in Diagnosis of Trichinosis.** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 97–101. [10 refs.]

The author discusses the earlier literature on the techniques for the examination of muscle for infection with the larvae of *Trichinella spiralis*. Following Mazzotti [this *Bulletin*, 1945, v. 42, 219], who concluded that the use of 10 gm. of diaphragm muscle appeared to be more effective than compression of the 1 gm. samples commonly used with subsequent digestion of the remainder of the muscle, the author decided to examine human diaphragms by the compression method and to use more than 10 gm. of muscle. Portions up to 5 gm. were suitable for study at one examination.

Examination of 100 human diaphragms in Mexico City revealed a high incidence (15 per cent.) of low-grade infections and 12 of these 15 cases had infections of less than 1 cyst per gm. of muscle, only 2 of them having viable larvae; while 9 showed less than 1 cyst per 10 gm. of muscle, none having viable larvae.

The viability of the larvae found by this method was determined by giving the positive diaphragms in food to albino rats free from trichiniasis (xenodiagnosis). These rats were killed after a month and their diaphragms were examined by compression, and if they were negative the whole rat was digested and the digest examined for larvae. The older method of examining by compression 1 gm. of diaphragm followed by digestion of the remainder would have missed most of the infections detected by the author's method, because this older method misses dead larvae in cases with less than 1 cyst per gm. of muscle. The author found that living larvae could not be detected microscopically with any degree of certainty. He urges that xenodiagnosis is often a means of detecting cases with viable larvae and that it could, together with microscopic examination, provide a more accurate index of the incidence of infection than any other known method.

G. Lapage

Gould, S. E., Van Dyke, J. G. & Gomberg, H. J. **Effect of X-Rays on Trichina Larvae.** *Amer. J. Path.* 1953, Mar.–Apr., v. 29, No. 2, 323–37, 6 figs. on 2 pls.

"A dose of 750,000 r. filtered x-ray applied to trichina larvae *in vitro* caused death of all or nearly all larvae within 1 to 2 hours after irradiation.

"Reproduction of trichinae was largely prevented by exposing larvae *in vitro* to x-radiation of 3500 r.; maturation to adult forms was largely prevented by exposure to 5000 or 6000 r.

"Pieces of trichinous meat in thicknesses of 1.45 cm. were rendered non-infective to experimental rats when the meat was exposed to 15,000 r. This suggests that the dose of x-radiation required to sterilize trichina larvae in commercial quantities of pork may not be excessive."

DEFICIENCY DISEASES

Bassir, O. **Nutrition in Nigeria.** *West African Med. J.* 1953, Jan.–Feb.–Mar., v. 2 (n.s.), No. 1, 30–41. [51 refs.]

A general discussion and review of the literature.

Kenney, R. A. **Renal Excretion of Urea in the West African.** *Brit. Med. J.* 1953, Mar. 14, 600–601.

The renal excretion of urea was examined in 10 West Africans and in 5 European controls. After a preliminary 3-hour period during which time no fluid was taken, the bladder was emptied and collections of urine were made hourly for a further period of 3 hours. At the end of the first hour, 20 gm. of urea in 100 ml. of water were administered by mouth. Thus a sample of the "resting" rate of excretion was obtained together with samples after the administration of urea which furnished values for the maximum concentration achieved and the total excretion during the period. In the case

of every parameter the European values were significantly higher than those obtained for African subjects and were in tolerable agreement with the accepted "normal" values for Europeans in a temperate climate. The low excretory values observed in Africans are paralleled by the low plasma urea concentration of these subjects [this *Bulletin*, 1953, v. 50, 328] and are probably due, in part at least, to physiological rather than pathological processes: but the diagnostic significance attached to these values in kwashiorkor is referred to. *J. H. Birkinshaw*

HARVEY, D. & TITMAN, W. L. **Plasma Protein Levels in East Africans.** *Kenya, Colon. & Protect. : Med. Dept., Records Med. Res. Lab. No. 11.* 1951, 4 pp. [14 refs.]

The protein content of the plasma of East Africans was examined in two groups consisting of (a) African soldiers receiving standard army rations (44 subjects) and (b) employees of the Kenya and Uganda Railways and Harbour Administration (29 subjects). The mean value (7·02 gm. per 100 ml. plasma) for the army personnel was well below the mean value (7·96 gm. per 100 ml.) found for the railway employees. The difference was almost entirely accounted for by the higher albumin content found among the latter. The diets in the two groups were similar, being based on maize, but there was a marked difference in meat consumption, approximately 8 oz. per day being available for the soldiers as against less than 3 oz. for the railwaymen, who, surprisingly enough, had the higher plasma protein.

Other African surveys are reviewed. The authors' army figures for total protein are slightly less than values obtained by other workers for West African soldiers [this *Bulletin*, 1946, v. 43, 866; 1948, v. 45, 810], South African Bantus on an institutional dietary and Uganda Africans living well [*ibid.*, 1950, v. 47, 269]. The railway workers' mean was comparable with that of West African villagers in the Gambia [*ibid.*, 1949, v. 46, 962].

J. H. Birkinshaw

THOMSON, F. A. **Eye Signs of Vitamin A Deficiency in the Ipoh District of Perak, Malaya.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1953, Mar., v. 47, No. 2, 159.

Clinical evidence of the ocular manifestations of vitamin A deficiency is common in children of the Ipoh district, Malaya. The author, from the Infant Welfare Centre, has kept records of such cases for 2 years. Diets are poor and particularly lacking in protein and vitamins.

In a series of 25 Malay children of 2 to 5, night blindness was present and examination showed photophobia and corneal pigmentation. In 10, Bitot spots or crinkling in the outer quadrant of the sclerotics were present.

More than 4 drachms of vitamin oil (16,000 units vitamin A per drachm) was not tolerated daily, and with it improvement was slow and the treatment was not effective in severe cases. Rapid improvement followed the injection of 1 ml. vitamin A concentrate (100,000 units per ml.), fortified by the oral administration of red palm oil, vitamin oil and skim milk. Provided that these were taken and a fair diet consumed, one injection was sufficient; but in severe cases a second might be needed after a week. Some who did not receive improved diets relapsed in 3 to 6 months, but responded to additional parenteral treatment. This treatment, though not wholly satisfactory, does seem to prevent much blindness, and mothers realize its value in curing night blindness, and bring their babies even from remote places.

H. J. O'D. Burke-Gaffney

Schaberg, A. & Straub, M. **The Adrenals in Hunger Cachexia.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1953, Mar., v. 5, No. 1, 49–55, 6 figs. [16 refs.]

"Changes of the adrenals indicating complete functional exhaustion were observed in severely cachectic Indonesians. These findings are compared with those observed in hunger cachexia in Europe. The possible relationship of these changes with differences in the pathology of Indonesians and Europeans is discussed."

SPRUE

Sifre, R. J. **Some Considerations on the Etiology of Sprue.** *Bol. Asoc. Méd. de Puerto Rico.* 1952, Dec., v. 44, No. 12, 488–95. [20 refs.]

This paper does not purport to be the result of original work, but is a digest of a number of hypotheses.

Broadly speaking it is surmised that climatological conditions and diet determine the types of intestinal flora in different parts of the world, especially in those areas in which tropical sprue is endemic; constituents of the diet also determine whether the intestinal flora belongs to the fermentative or putrefactive type. Predominance of carbohydrates encourages bacteria and fungi for the growth of some of which vitamins of the B complex and especially vitamin B_{12} are essential. The host is thereby deprived of this source vitamin, so that the altered bacterial flora persists and growth requirements of other essential nutrient substances may provoke additional deficiencies. Thus the clinical picture of sprue is produced. It is suggested that a recurrence of the bacteriological imbalance accounts for the characteristic relapses. The diarrhoea is accounted for by intestinal irritation which in turn reduces the absorptive capacity and involves the sugar, other carbohydrates and fat. Creatorrhoea [the presence of muscle fibres in faeces] may provoke a negative nitrogen balance and hypoproteinaemia. An immense amount of work remains to be done on the food requirements of intestinal flora for certain nutrient substances, and for this continued efforts of bacteriologists and biochemists are essential. *Philip Manson-Bahr*

Houli, J. Esprue. Considerações a propósito de um caso de cura clínica. [**A Case of Sprue, with Recovery, in Brazil**] *Hospital.* Rio de Janeiro. 1952, Nov., v. 42, No. 5, 659–86, 3 figs. [58 refs.]

A lengthy discussion, with an account of a case of sprue, which is uncommon in Rio de Janeiro.

HAEMATOLOGY

Astaldi, G. & Tolentino, P. **Studies on the Pathogenesis of Thalassaemia.** *J. Clin. Path.* 1952, May, v. 5, No. 2, 140–44, 3 figs. [11 refs.]

In this disease the erythrocytes are abnormal, their life span is shortened and the rate of haemolysis increased. The authors distinguish between minimal, minor and major forms. In the minimal form compensatory hyperplasia of the bone marrow is sufficient to balance the increased

haemolysis. In the major form, Cooley's anaemia, the compensatory mechanism is unable to keep pace with the haemolysis. The minor form resembles the major form, but is less severe. The major form depends upon the presence of the corresponding abnormal gene in double dose. Apparently the authors consider that both minor and minimal forms correspond to the carrier state, that is, one dose of the gene, but this is not stated quite explicitly. *J. A. Fraser Roberts*

Ravisse, P. Recherches sur la sicklémie chez les pygmées. [**Studies on Sickling in Pygmies**] *Méd. Trop.* Marseilles. 1953, Jan.–Feb., v. 13, No. 1, 64–5.

In the Likouala area, along the reaches of the river Oubangi in French Equatorial Africa, there are two African tribes, the Bondjo (a settled tribe) and the Babinga, who are pygmies living in the forest: there are about 5,000 Babinga. The author examined the blood of 537 Babinga and 221 Bondjo for evidence of sickling. It was found in 6·8 per cent. of the pygmy tribe and in 25·3 per cent. of the Bondjo. In females of both tribes the percentages were slightly smaller. No case of sickle-cell anaemia was found. It seems that there is a marked difference between the two ethnological groups. *H. J. O'D. Burke-Gaffney*

Dunlop, K. J. & Mozumder, U. K. **The Occurrence of Sickle Cell Anaemia among a Group of Tea Garden Labourers in Upper Assam.** *Indian Med. Gaz.* 1952, Sept., v. 87, No. 9, 387–91.

Coincidences in medical research are remarkable. In February, 1952, the sickle-cell trait was reported to exist in South India [Lehmann and Cutbush, this *Bulletin*, 1952, v. 49, 1152]. Now in September, 1952, sickle-cell anaemia is reported to exist in 3 children, two from Bihar and one from Orissa, all belonging to families working as labourers in Assam. One must assume that there is no connexion between these findings and the previous ones, as the latter authors do not refer to them in their publication.

In the case of 2 children sickle-cells were discovered in the mother only and not in the father, but on one occasion both parents were affected. Of the first 2, a maternal aunt of one and the maternal grandmother of the other were sickle-cell trait carriers. Of the third child 2 siblings were normal and 2 showed sickle cells but were not anaemic. *H. Lehmann*

Brumpt, L. C. Anémie à hématies falciformes et chirurgie. [**Sickle Cell Anaemia and Surgery**] *Extrême-Orient Méd.* Hanoi. 1952, Jan.–May, v. 5, No. 1, 11–15, 1 fig. on pl.

In a 24-years-old woman of mixed white French and African parentage, an operation for scoliosis was followed by a haemolytic crisis on the next day. It was discovered that she was a sickle-cell trait carrier [although it it not quite certain whether the author makes a clear differentiation between this diagnosis and that of sickle-cell anaemia].

It is suggested that the haemolytic crisis followed the anoxaemia, brought about by the use of N_2O as an anaesthetic, which is thought to have produced sickling *in vivo* on a scale comparable to that seen after a 2 days incubation of a blood sample *in vitro*, where virtually 90 per cent. of the cells had become sickle-cells. *H. Lehmann*

Floch, H. Considérations diverses sur l'anémie à hématies falciformes. [**Various Aspects of Sickle-Cell Anaemia**] *Arch. Inst. Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 271.* 1952, Sept., 15 pp. [21 refs.]

Vitamin B_{12} was found to have a beneficial influence on the fever and joint pain of sickle-cell anaemia. Whether there was any effect on the anaemia itself was not certain, but the author is inclined to assume that there might have been a beneficial influence.

[As it is well known that, in sickle-cell anaemia, remarkable improvement can occur between crises without any treatment, one would have felt happier if the author had compared the few patients which, he suggests, responded to Vitamin B_{12}, with others to whom no treatment had been given.] *H. Lehmann*

Trincão, C., Gouveia, E., Franco, A. & Parreira, F. L'ionisation du fer par le suc gastrique dans l'anémie de l'ankylostomiase. [**Ionization of Iron by Gastric Juice in Hookworm Anaemia**] *Schweiz. med. Woch.* 1953, Jan. 24, v. 83, No. 4, 81. [13 refs.]

The usual explanation for iron deficiency anaemia in ankylostomiasis is that it is due to haemorrhage and, as iron is one of the marginal foodstuffs in most populations, a persistent loss of the iron in blood is not easily replaced by ordinary diet. It is also known that, in ankylostomiasis, achlorhydria is often found which, by itself, may be expected to lower the ability to digest and utilize food. It is, therefore, of interest that the authors report of yet a third handicap discovered by them in the gastric juice of patients suffering from anaemia of ankylostomiasis.

Of 9 patients, the hydrochloric acid production was measured in 5, and was found normal in 4 of them. In all 9, the amount of iron reduced by stomach juice was only 35 per cent. to 70 per cent. (average 53 per cent.) of that seen in experiments with normal stomach juice.

This particular note does not give experimental details, but refers, as regards technique, to a book by G. Hemmeler, *Metabolism du Fer*, Masson et Cie, Paris, 1951. *H. Lehmann*

DERMATOLOGY AND FUNGUS DISEASES

Lamb, J. H., Kelly, Florene C., Shackelford, P. O., Rebell, G. & Koons, R. C. **Pregnenolone Acetate in Treatment of Mycetoma (Nocardiosis).** *Arch. Dermat. & Syph.* 1953, Feb., v. 67, No. 2, 141–5.

A girl aged 6 sustained a pitchfork wound on the dorsum of the foot, penetrating into the astragalus bone. The wound suppurated, but under treatment with penicillin for 20 days it healed and remained apparently healthy for 3 months. Then an inflammatory swelling developed in the site of the wound, and, when this was incised, persistent sinuses lined by unhealthy granulations were formed. "Granules" were not found in the pus from the sinuses, but stained smear preparations showed the presence of a Gram-positive bacilliform organism measuring about 1μ in thickness, which did not show branching but presented alternate swellings and constrictions, probably indicating a stage of fragmentation. In culture, this organism was identified as an acid-fast species of *Nocardia* differing from the

typical *Nocardia asteroides*. It was pathogenic for guineapigs by intraperitoneal inoculation; causing death in 5 to 10 days.

When the patient was examined 7 months after the original injury she had 2 discharging sinuses on the dorsum of the foot and her general condition was poor. Treatment given consisted of local radiotherapy to the infected part with filtered X-rays in doses of 200 r units on alternate days to a total of 1,600 r units, "Tricombisul" (triple sulphonamide) 1·5 gm. daily and intensive treatment with potassium iodide by mouth as well as local application of sulphonamide powder and glycerin. This treatment caused no observed improvement and at the end of a month a second focus of the disease developed immediately above the position of the first. Nevertheless, the drug treatment was continued with the addition of aluminium-penicillin tablets by mouth, 25,000 units 4 times daily. After nearly 2 months there was still no improvement and the radiotherapy course was repeated. This was followed by penicillin procaine, 600,000 units daily for 5 days and 150 gm. of aureomycin thrice daily. A month later, this unsuccessful treatment was stopped and the steroid, pregnenolone acetate, was given in tablet form in doses of 100 mgm. twice daily. After 5 weeks a marked improvement was noticed and a local reaction with better drainage from the lesion set in. At the end of 8 weeks the lesion was definitely healing and the dose of pregnenolone acetate was increased to 300 mgm. daily. From this time onward the healing process was uninterrupted and after nearly 8 months of this treatment it appeared to be complete, but as a precautionary measure pregnenolone acetate was continued at a dose of 100 mgm. daily for a month and then at 100 mgm. on alternate days. During this treatment, the child's health was restored and she gained 18 lb. in weight.

Although there may be a theoretical objection to the administration of steroid drugs to children, in the present case the 8 months' continual treatment with pregnenolone acetate to a total dosage of about 60 gm. caused no sign or symptom of metabolic alteration and no toxic reaction.

J. T. Duncan

See also p. 650, Wildervanck, Winckel and Collier, **Tropical Eosinophilia combined with Histoplasmosis.**

Schwarz, J. & Baum, G. L. **North American Blastomycosis (Geographic Distribution, Pathology and Pathogenesis).** *Documenta Med. Geograph. et Trop.* Amsterdam. 1953, Mar., v. 5, No. 1, 29–41, 12 figs. & 1 diagram. [22 refs.]

"(1) A short introduction to the mycology of blastomycosis is given and the restriction of clinical cases to the North American Continent stressed.

"(2) The similarity of pathological changes in blastomycosis with other granulomatous diseases, especially tuberculosis, histoplasmosis, and coccidiomycosis is illustrated.

"(3) The pulmonary origin of blastomycosis is postulated essentially on the basis of lung findings and the absence of a primary complex in 'skin cases'."

Kletter, G., Winckel, W. E. F. & Collier, W. A. **A Case of South American Blastomycosis in Surinam.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1953, Mar., v. 5, No. 1, 25–8, 5 figs.

"The authors describe a case of South American blastomycosis in Surinam, which was localized only in the skin of the face.

" Histopathological examination and an animal test revealed the parasites, *Blastomyces brasiliensis*, some of which contained a doubly-refracting, crystalline body."

French, A. J. & Russell, S. R. **Chromoblastomycosis. Report of First Case recognized in Michigan, apparently contracted in South Carolina.** *Arch. Dermat. & Syph.* 1953, Feb., v. 67, No. 2, 129–34, 4 figs. [20 refs.]

Tager, M. **The Effect of Isoniazid and Iproniazid on** *Coccidioides immitis*. *Amer. Rev. Tuberculosis.* 1953, Apr., v. 67, No. 4, 538.

While isoniazid inhibited *C. immitis* at 1,000 μgm. *in vitro*, no evidence was found that either this drug or iproniazid protected Swiss mice against *Coccidioides* infection.

TROPICAL OPHTHALMOLOGY

Shalom, E. [**Trachoma in Jaffa Schools**] *Harefuah.* Jerusalem. 1953, Feb. 15, v. 44, No. 4 [in Hebrew 87–8. English summary 88–9.].

The author states that the incidence of trachoma in Israel has undoubtedly increased as a result of recent immigration from Arab countries where trachoma infection is heavy. In order to contribute towards a statistical estimate, he records the results of examination of some 4,000 pupils of Jaffa schools. The results are shown in 5 tables.

It was found that incidence was highest in 308 Arab pupils of one school, 109 of 308 (about 36 per cent.) being infected: the trachoma was, however, mild and uncomplicated. Among Jews, 0·5 per cent. of pupils of the General Trend and 4 per cent. of the Religious Trend, were found to be infected. The incidence of infection in children of " old settlers " was 0·4 per cent., in contrast to that of 7 per cent. in children of new immigrants in Jaffa.

The author, regarding the index in children as the most reliable means of evaluating the incidence of trachoma in the population, estimates that there are some 70,000 to 80,000 cases of trachoma in Israel. This estimate is based on comparison of his figures with those of the Israel Health Services.

H. J. O'D. Burke-Gaffney

See also p. 643, Thomson, **Eye Signs of Vitamin A Deficiency in the Ipoh District of Perak, Malaya.**

MISCELLANEOUS DISEASES

Larribaud, J. Tindouf et le Sahara occidental. [**Tindouf and the Western Sahara**] *Arch. Inst. Pasteur d'Algérie.* 1952, Sept., v. 30, No. 3, 244–318, 12 text figs. & 16 figs. on 8 pls. [Refs. in footnotes.]

Tindouf is a small oasis about 500 kilometres south-east of Agadir, inhabited by the non-nomadic Tadjakant, the more interesting, nomadic Reguibat, and a few Europeans. The population numbers rather more than 1500. It is the administrative headquarters of a large area.

The author gives a long and interesting account of the physiography of the area, its history and the history of the nomadic people, a description of the town itself and its houses. He discusses the two sections of the population in their social and family lives, religion, and laws. The most interesting section for readers of this *Bulletin* is the concluding section (18 pages) on

health, in which the various diseases are considered *seriatim*. There is a hospital at Tindouf.

Most of the common infective diseases are found from time to time; the tuberculin index is 27·8 per cent. in adults; venereal diseases are fairly prevalent; malaria is not endemic. Malnutrition is a problem, since the food is deficient in both quantity and quality, and a syndrome resembling kwashiorkor is seen in infants about the time of weaning. The viper *Cerastes cerastes* causes trouble every year, and scorpion sting is quite common. A short section on traditional treatments for a number of conditions ends the section. It is evident that the pattern of disease is what one would expect in a relatively isolated desert community. *Charles Wilcocks*

LAUFER, W. E. **Onyalai and its Treatment.** [Correspondence.] *South African Med. J.* 1953, Mar. 21, v. 27, No. 12, 255.

The correspondent, who is a medical officer practising in Francistown, Bechuanaland, considers onyalai to be an allergic manifestation, the allergy expressing itself by an increased capillary fragility with bleeding. He therefore decided to employ antihistamines (*Anthisan* and *Phenergan*) in combination with adrenaline, the régime being as follows:—

1. Adrenaline by injection, up to 12 minims for an adult—twice daily for 2 to 3 days.
2. Anthisan or Phenergan—1 tablet twice or thrice daily for 5 to 7 days.
3. No other treatment was given beyond an iron mixture to counter the anaemia.

In 20 consecutive cases of onyalai he obtained complete and rapid recovery in every instance and there were no relapses. In his experience, previously, he had found a 30 per cent. mortality.

[This work may prove to be of considerable value and one therefore looks forward to a more detailed report of his trials with these drugs.]

His haematological investigations are also of interest. He has observed that the platelet counts may not be reduced, although he finds the bleeding time to be always prolonged. *Michael Gelfand*

DE LAJUDIE, P. & BRYGOO, E. R. Contribution à l'étude des propriétés biochimiques du bacille de Whitmore. [**Contribution to the Study of the Biochemical Properties of Whitmore's Bacillus**] *Ann. Inst. Pasteur.* 1953, Mar., v. 84, No. 3, 509–15. [24 refs.]

The results are given of the systematic examination of 41 strains of *Pfeifferella whitmori* isolated over a period of 6 years from blood, pus and other human sources in Saigon. The cultures were incubated for 2 days at 37°C., then kept at room temperature (about 28°C.) for further observation. All the strains had the following characters: aerobic and facultatively anaerobic, pellicle growth in broth, serum digested in 1–7 days, gelatin liquefied within 48 hours, M.R. –, V.P. –, indole –, coagulase –, urease –, catalase +, reduction of nitrates, reduction of methylene blue, feeble haemolysis of mammalian red cells, progressive peptonization of milk. The production of H_2S was feeble and inconstant. All strains except two utilized sodium citrate. Acid, without gas, was produced, sometimes slowly, from glucose (34 strains), maltose (27), mannitol (3), lactose (23), arabinose (20), rhamnose (16), xylose (32), raffinose (36), inulin (38), dextrin (40) and galactose (41). None of the strains fermented dulcitol in 7 days.

J. C. Cruickshank

Wildervanck, A., Winckel, W. E. F. & Collier, W. A. **Tropical Eosinophilia combined with Histoplasmosis.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1953, Mar., v. 5, No. 1, 67–71.

"The authors describe two patients with tropical eosinophilia, without demonstrable infection with *Str. stercoralis* or filaria; the syndrome in both disappeared after treatment with hetrazan. A third patient with tropical eosinophilia and *Str. stercoralis* did not react to hetrazan but improved after a course of mapharsen.

"All patients were infected with *Histoplasma*, a coincidence which might point to a new factor in the aetiology of tropical eosinophilia."

Coutinho, A. & Menezes, H. Eosinofilia tropical. Ensaio de transmissão direta a voluntários com material filtrado. [**Tropical Eosinophilia**] *Hospital.* Rio de Janeiro. 1951, June, v. 39, No. 6, 871–8, 12 graphs.

A description of unsuccessful attempts to produce lesions of tropical eosinophilia in volunteers by means of filtrates of biological material.

Passmore, R. **Observations on the Epidemiology of Stone in the Bladder in Thailand.** *Lancet.* 1953, Mar. 28, 638–40, 2 figs. [10 refs.]

The author, while on a visit to Thailand as a nutrition consultant, was informed that stone in the bladder was a common complaint in the N.E. parts of the country. During a stay in Bangkok and a tour of peninsular Thailand down to the Malayan border he satisfied himself that there was no undue incidence of vesical calculus either in the capital or in the south. In November and December 1951 he visited Ubon, the most easterly province of N.E. Thailand, with a population of 850,000. The soil in this part of the country is poor, with much shifting cultivation, large areas of uncultivated land and a sparse population. Rice is the principal crop, accounting for 99·5 per cent. of the area sown, and is the staple diet of the inhabitants, supplemented by fish during the monsoon season, which lasts from May to October; the total annual rainfall is 33 to 66 inches. During the remainder of the year there is little or no rain and much of the landscape is reduced in appearance to a desert. Cattle are kept as beasts of burden, are never milked and seldom killed and eaten.

In the capital there is a hospital of 100 beds, which serves the whole population of the province; from 1936 to 1942 operations for vesical calculus numbered 1,250 and during the 4 years 1948–51 there were 610 operations on persons resident in the province, which is 1·80 operations per 10,000 of the population per annum (limits 0·6 and 3·2), with no evidence of any special focus. Calculated on a basis of population structure it was found that male patients outnumbered female by 8 to 1, with a peak incidence of 14·5 operations per 10,000 in boys of 5 years of age, with a moderate rise in incidence at ages of 50–60. Symptoms had usually been present from 6 months to 2 years and about 25 per cent. of the patients stated that another member of the family had suffered from stone. In a village of 2,000 inhabitants 16 patients were seen, of whom 4 had undergone operation, so that approximately 1 in 125 persons had suffered from stone at some time. The general health and nutrition of the children was no worse and perhaps a little better than that of children in other villages of Thailand and other parts of S.E. Asia who do not suffer from stone. It appears probable that large numbers of the population form deposits in the bladder which are voided in the urine and that the high incidence in small boys is due to the anatomy of the urethra. Renal calculi appear to be rare.

The author investigated the diet but, although it was not rich in vitamin A, he found that clinical signs of deficiency were uncommon. The staple rice

has a low calcium content, the water was not unduly hard, nor could any other food regularly consumed add an excess of the mineral. The hot dry climate, like that of the Punjab, might predispose to stone formation, but most hot countries are free from stone and in the past it has been common in such places as Iceland. The author briefly reviews recent work indicating that stone formation may be due to a noxious factor in the diet, upsetting the balance of urinary colloids which keep the supersaturated electrolytes in solution (Butt and Hauser, *New England J. of Med.*, 1952, v. 246, 604); or interfering with production or excretion of citric acid by the kidney (Shorr, *J. Urology*, 1945, 53, 507). In conclusion the author admits that he could find no cause for the abnormal prevalence of vesical calculus in this region [for McCarrison's work on stone in the bladder in India, see this *Bulletin*, 1928, v. 25, 499]. *W. L. Harnett*

PROTOZOOLOGY: GENERAL

Seneca, H. & Ides, Diane. **The Effect of Magnamycin on Protozoa and Spermatozoa.** *Antibiotics & Chemotherapy.* New York. 1953, Feb., v. 3, No. 2, 117–21. [10 refs.]

"1. The *in vitro* studies indicate that Magnamycin is inhibitory to cultures of *E. histolytica* in 31¼ to 125 gamma per ml.

"2. *T. cruzi* and *L. donovani* are inhibited in a concentration of 31¼ to 62½ gamma per ml.

"3. *T. rhodesiense* is killed in 1 per cent. Magnamycin solution in 4 minutes and in 125 gamma per ml. in 261 minutes.

"4. *T. vaginalis* and *T. foetus* are inhibited in 250 gamma per ml.

"5. Human spermatozoa are immobilized in 10 mg./ml. in 44 minutes, in 1 mg./ml. in 95 minutes and in 100 gamma per ml. in 215 minutes. Ten gamma per ml. and 1 gamma per ml. had practically no effect.

"The *in vitro* studies indicate that a trial should be given in the treatment of amebiasis, leishmaniasis, and trypanosomiasis with Magnamycin."

Woodruff, A. W. **Toxoplasmosis.** *Med. Illustrated.* 1953, Apr., v. 7, No. 4, 232–7, 7 figs.

This is a general account of toxoplasmosis written by the Professor of Clinical Tropical Medicine at the London School of Hygiene and Tropical Medicine.

It discusses briefly the pathology, clinical features, diagnosis, prognosis and treatment of this relatively newly described disease. The excellent illustrations include photomicrographs of the parasite and of liver lesions, photographs of children with cerebral lesions and a diagram of specific lesions of the ocular fundus. For practitioners in Britain this will prove a useful compendium.

Kunert, H. & Jüptner, H. Untersuchungen über das Vorkommen der Toxoplasmose. [**Investigations on the Incidence of Toxoplasmosis**] Reprinted from *Geburtsh. u. Frauenhk.* 1952, Oct., v. 12, No. 10, 910–17. [20 refs.]

The amount of human infection with toxoplasmosis—as tested by means of the Sabin-Feldman test—has been recorded by workers in different parts of the world. In Cincinnati, Sabin and Feldman found positives in 5 to 65 per cent. of the normal population; in Heidelberg and district 11 per cent. of positives were found, in Bonn there were 15 per cent. Among persons in Hamburg suspected clinically of having the infection, 18·6 per cent. gave a positive result in the test. An investigation in Vienna of

suspected cases, with the toxoplasmin skin test, resulted in 62·8 per cent. of positives.

The present paper records that in Berlin only 1 positive result with the Sabin-Feldman test was obtained in the examination of the sera of 137 persons. This group included 66 women who had had late abortions, miscarriages or children with congenital defects, 14 patients with endangiitis obliterans, 20 patients suffering from atypical pneumonia, imbecility and intracranial calcification and 37 persons engaged in veterinary work or the care of animals. Reference is made to work done at the Robert Koch institute in 1950–52 in which 18 positives were found in 1,000 routine blood samples and 19 positives in 330 patients suspected of infection on clinical grounds or on the medical history.

Some stress is laid on the variations observed in the test when different brands of methylene blue are used and also on the evidence that the test is not specific as, for example, that one observer recorded a 57·8 per cent. positive rate in 102 cases of pulmonary tuberculosis [this *Bulletin*, 1952, v. 49, 906]. *M. E. Delafield*

Chamberlain, D. M., Docton, F. L. & Cole, C. R. **Toxoplasmosis. II. Intra-Uterine Infection in Dogs, Premature Birth and Presence of Organisms in Milk.** *Proc. Soc. Exper. Biol. & Med.* 1953, Feb., v. 82, No. 2, 198–200.

"1. Toxoplasma of human, canine, and porcine origin was pathogenic for pregnant bitches and caused abortion or premature parturition. The organism was isolated from 23 of 28 pups born of 5 bitches. 2. *In utero* transmission of toxoplasmosis was demonstrated by isolation of toxoplasma from each of 8 pups (born of 4 bitches) which were collected aseptically and sacrificed at the time they emerged from the birth canal. Isolation of organisms from the placenta and allantoic fluid was further evidence of *in utero* transmission. 3. A mammary gland emulsion from one bitch and samples of milk collected aseptically from 4 lactating infected bitches each revealed toxoplasma."

ENTOMOLOGY AND INSECTICIDES: GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Kemper, H. Über stechende Gliedertiere. [**Biting Insects**] *Schädlingsbekämpf.* 1953, Feb., v. 45, No. 2, 21–8.

A general article on the usual insects known to bite human beings in temperate climates. After discussing the different types of insect concerned, with comments on others which sting, the article deals principally with host reactions to the bites. Apart from some instructive anecdotes, this paper is based on published literature for which a very few references to German papers are given.

The article appears to have been designed to interest the general practitioner in Germany. *D. S. Bertram*

Vincke, I. H. & Leleup, N. Description de la pupe, de la larve et de l'oeuf de *Anopheles concolor Edwards.* [**Description of the Pupa, Larvae and Egg of** *Anopheles concolor*] *Rev. Zool. Bot. Africaines.* 1949, v. 42, Nos. 3/4, 245–7, 4 figs. Un nouvel anophèle dendrophile du Katanga: *Anopheles berghei* sp. nov. [**A New Forest-Dwelling Anopheline from Katanga**] *Ibid.*, 248–9, 2 figs. Notes biologiques et éthologiques sur les anophèles dendrophiles du Katanga. [**Biological and Ecological Data on Forest-Dwelling Anophelines from Katanga**] *Ibid.*, 250–58. [15 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1953, Feb., v. 41, Pt. 2, 17.]

The first 2 papers are concerned with 2 of 4 species of *Anopheles* found in forest in Katanga, Belgian Congo, and the third with all 4; the 2 not mentioned in the titles are *A. dureni* Edw. and *A. implexus* (Theo.). They are closely associated with the forest galleries, remain near their breeding places and probably feed on small mammals. *A. implexus* is less restricted in its ecological requirements than the other species, and sometimes occurs along streams that are relatively little wooded. It and *A. concolor* Edw. occasionally feed on man near their breeding places, but the authors' observations indicate that *A. dureni* does not normally do so. Duren, however, recorded *A. dureni* in huts in Kwango and believed that it fed on man outside them; it is possible that the species has physiological races.

Leleup, N. & Lips, M. Un anophèle cavernicole nouveau du Katanga: *Anopheles rodhaini* n. sp. [*Anopheles rodhaini*, **a New Cave-Dwelling Anopheline in Katanga**] *Rev. Zool. Bot. Africaines.* 1950, v. 43, Nos. 3/4, 303–8, 3 figs.

———. Considérations sur l'éthologie et la dispersion actuelle des anophèles cavernicoles du Congo belge [**Observations on the Habits and Distribution of Cave-Dwelling Anophelines in the Belgian Congo**] *Ibid.*, 353–5. [Summary taken from *Rev. Applied Entom.* Ser. B. 1953, Feb., v. 41, Pt. 2, 30.]

In the first paper, the adults of both sexes of *Anopheles rodhaini*, sp. n., and larvae believed to be of the same species are described from the Kakontwe cave (Haut Katanga, Belgian Congo).

In the second, it is recorded that Anopheline larvae were found in 9 caves in Bas-Congo in 1949 and adults of *A. vanhoofi* Wanson & Lebied, the only cave-dwelling Anopheline known from the Belgian Congo apart from *A. rodhaini* in 3 of them. The adults of both species were closely associated with bats, and the larvae bred only in pools the bottoms of which bore a light covering of bat guano. *A. rodhaini* is known only from the type locality. It is thought that it may be very restricted as a result of the destruction of most of the caves of the district by landslides. Species of *Plasmodium* were found in the bats in both districts.

Rageau, J. & Adam, J. P. Culicinae du Cameroun. [**Culicines of the Cameroons**] *Ann. Parasit. Humaine et Comparée.* 1952, v. 27, No. 6, 610–35, 2 figs. [69 refs.]

The authors' report on collections, particularly of larvae of Culicine mosquitoes, made during 4 years in the French Cameroons. Little attention has been paid in the past to mosquitoes of this region and the list of 65 Culicine species contains many new records for the Cameroons. The

species are distributed in 10 genera: *Toxorhynchites* (2 spp.), *Harpagomyia* (1 sp.), *Uranotaenia* (4 known and 1 undetermined spp.), *Aëdomyia* (2 spp.), *Theobaldia* (1 sp.), *Ficalbia* (2 spp.), *Taeniorhynchus* (4 spp. including *africanus* and *uniformis*), *Aëdes* (23 spp. including *aegypti*, *simpsoni*, *africanus*, and *vittatus*), *Eretmapodites* (3 spp.), and *Culex* (22 spp., including *fatigans*, and a few, doubtfully, of *pipiens*). A separate paper will report on 15 species of *Anopheles*.

Under each species are given notes on larval breeding places and, briefly, adult habits where they were observed, and locality names of places of collection. Species recorded as attacking man are: *Taeniorhynchus* (*Coquillettidia*) *versicolor* (at sunset near rivers), *T.* (*Mansonioides*) *uniformis* and *T.* (*M.*) *africanus*, *Aëdes aegypti*, *Aëdes vittatus*, *E. chrysogaster*, *C. fatigans* (a common mosquito), occasionally *C. tigripes*, *C. annulioris*, and an uncertain species, possibly *C. rubinotus*. A number of *Aëdes* and *Culex* spp. were bred to adult (but in no case does this imply complete cyclical development from egg to egg). It is stated that probably *Aëdes aegypti* and *C. fatigans* are vectors of *W. bancrofti* and the former also of dengue. A table and 2 charts relate the monthly frequency of breeding of numerous of the species to rainfall as observed at Yaoundé.

D. S. Bertram

Williams, R. W., with the technical assistance of Maude Nicholls. **The Growth Stimulating Effect of APF, Terramycin Hydrochloride, Vitamin B_{12} and an Undetermined Factor " X " upon *Aëdes aegypti* (L) (Diptera, Culicidae).** *Amer. J. Trop. Med. & Hyg.* 1953, Jan., v. 2, No. 1, 109–14. [14 refs.]

It would be useful to obtain large adults of *Aëdes aegypti* in a short time for various sorts of experimental work. With this point of view in mind experiments were made to determine if the addition of antibiotics to the larval food of this mosquito improved their rate of growth and final size. The control diet was a nutritious proprietary mouse food in powder form. Of experimental diets, the most beneficial was a daily supply of 175 mgm. of 50 pts. by wt. of this mouse food powder, 50 pts. by wt. of APF (Animal Protein Factor, " Bi-Con 3 " with a vitamin B_{12}, streptomycin and terramycin content) with, in addition, 2·5 mgm. terramycin hydrochloride, and 1·5 μgm. vitamin B_{12}. This is designated as the S (superior diet). Tests were made in 10″ × 8″ × 2″ enamel pans containing 100 larvae in a litre of distilled water; they were kept at 27°C. At 37°C. mortality was high without increasing the rate of development. Size was assessed by measuring the lengths between the forward margin of the thorax and the base of the siphon in 10 fourth-stage larvae taken at random from a dish.

On the S diet the larvae were on the average about 4 per cent. larger than the largest reported in nature or the controls. There was considerable variation, however, in the larval size in repeat tests of identical diets which could not be attributed to the diet, temperature, *p*H, or the amount of food supplied. This undetermined factor is called the " X " factor and is thought to be of a constitutional, genetic nature in the mosquito material used in the different tests. When it operated favourably the increase of size of larvae on the antibiotic diet (S) was as much as 10 per cent. more than for the average size of control larvae. Both the control and the S diet produced mosquitoes in slightly less than 7 days. The larval stage lasted 4·7 days

on the S diet, but only 4·5 days on the control diet. The duration of pupal periods was reversed to the same degree.

Other antibiotics and B_{12} substitutes might be worth a trial as means of obtaining more consistent results. *D. S. Bertram*

See also p. 601, de Meira, A campanha de erradicação de culicídeos na Ilha do Sal (Cabo Verde) (Dezembro de 1948 a Dezembro de 1950). [**Campaign for the Eradication of Mosquitoes in the Island of Sal, Cape Verde Islands, from December 1948 to December 1950**]

Tanimura, S. & Hine, S. [**An Experimental Study on Function of the Dilute Solution of Inorganic Strong Acids upon Larval Mosquitoes (*Aëdes albopictus* and *Aëdes japonicus*), paying Special Attention to the relation between the Function and pH and to the Possibility of Practical Use for eradicating Larvae**] *Shikoku Acta Med.* 1952, Apr., v. 3, No. 2, 86–90, 4 charts. [In Japanese.] English summary.

A dilute solution of certain inorganic acids was found to be lethal in a few days to larvae of *Aëdes albopictus* and *Aëdes japonicus* when the *p*H was 2·0 or more. *Aëdes japonicus* was 1·8 times more resistant to these acid solutions than was *Aëdes albopictus*. The lethal efficacy in terms of time for H_2SO_4, HNO_3 and HCl, was in the ratio of 1 : 1·5 : 2, so that sulphuric acid was the most effective.

It is claimed that a weak solution of H_2SO_4 has little deleterious effect on " the other animals or plants, though it disappears after a short span of time ". It is said that the watery solution (up to a maximum concentration of *p*H 1·6) will destroy the larvae in 18–24 hours, and is a larvicide of low cost for use in collections of stagnant water. *H. J. O'D. Burke-Gaffney*

Stage, H. H., Gjullin, C. M. & Yates, W. W. **Mosquitoes of the North-western States.** *U.S. Dept. Agric. Agric. Handb. No. 46.* 1952, Nov., 95 pp., 1 pl., 39 figs. & 8 maps. [175 refs.] [35 cents.]

This is a handbook on the mosquitoes of Oregon, Washington and Idaho in which there are nearly 40 species and sub-species representative of *Aëdes* (25 spp.), *Culex* (4 spp. including *C. pipiens*), *Culiseta* (5 spp.), *Mansonia perturbans*, and *Anopheles freeborni*, *A. occidentalis*, *A. pseudopunctipennis franciscanus*, and *A. punctipennis*. *A. freeborni* is the most important malaria vector since malaria was introduced, probably about 1830. *Aëdes dorsalis*, a brackish-water breeder and a fresh-water breeder, and *Culex tarsalis*, breeding in a variety of sites, have been found to harbour virus of western equine encephalomyelitis and St. Louis encephalitis in nature. The latter is considered the principal vector. *Culex pipiens* occasionally, and commonly 5 species of *Aëdes*, are troublesome biters of man. *Culiseta inornata* attacks cattle severely but man only infrequently. This manual provides, with keys, descriptions and illustrations, all the information that would be required to identify the adults and larvae of these mosquitoes, to know where to search for them, how to collect and preserve them. Control measures are dealt with at some length, illustrated by photographs, and incorporate modern methods involving residual insecticides, particularly DDT and some of the newer repellents. It is noted that resistance to DDT by *C. tarsalis* has not been observed (up to the end of 1951) in these North-Western States, although reported from the West Coast of California.

D. S. Bertram

Fox, I. **Notes on Puerto Rican Mosquitoes including a New Species of *Culex*.** *J. Parasitology.* 1953, Apr., v. 39, No. 2, 178–82, 1 fig. on pl. [13 refs.]

Holway, R. T., Mitchell, W. A. & Salah, A. A. **Studies on the Seasonal Prevalence and Dispersal of the Egyptian Housefly. Part II. The Larvae and their Breeding Areas.** *Ann. Entom. Soc. of America.* 1951, Dec., v. 44, No. 4, 489–510, 14 figs.

Part I of this series dealt with the seasonal abundance and dispersal outdoors and indoors of the adult fly, *Musca domestica vicina*, in Egypt [this *Bulletin*, 1952, v. 49, 729]. The present paper considers the seasonal frequency of breeding by *Musca domestica vicina* in 4 main types of breeding place (latrine-dumps, compost piles, animal houses, and, least important, fuel cake) and discusses the changes in their use throughout the year in relation to climatic factors and the habits of the adult fly.

Latrine-dumps are outdoor depositories for human faeces from cess-pits, garbage and waste waters. They are often sited at the edge of village pools, canal banks and beside ditches, thus remaining moist even in the dry, hot weather. Compost piles are outdoor accumulations of soil and animal excrement from the room in which the animals (donkey and draught buffalo) are kept. Other wastes, including human faeces, are often dumped on the pile. Scattered soil and droppings provide breeding places indoors in the animal rooms. Fuel cake consists of hand-made discs or bars of buffalo-dung and straw and these are stacked out of doors to dry until fit to burn.

On the whole, the amount of breeding follows closely the bimodal curve of adult abundance with a peak in the spring and a lower peak in the autumn. In the hot, dry, summer months of June to August less than 50 per cent. of apparently suitable latrine-dumps are actively breeding maggots and this appears to be simply related to the sharp decline in the numbers of adults surviving the high temperatures of these months and a marked concentration of flies indoors rather than outdoors. Breeding is maximal in June and July indoors in the waste and excrements of animal rooms. Outdoor compost piles are most productive in July. This later peak in their use as compared with that of the latrine-dumps (maximum breeding in April to May) is explained by the fact that much of compost material is derived from the animal rooms where breeding continues without decline during June and July. After August, until December, temperatures outdoors begin to drop below 25°C., humidity rises, adult flies again disperse out of doors and increased breeding in latrine-dumps and compost piles occurs again. But it is not so great as in the spring and early summer, although climatic conditions are not dissimilar from those of the early part of the year. The reasons for the lower breeding activity in autumn remain obscure. It may be because of disease killing more adult flies at this time of the year; or the virility and reproductive potential of the small fly and larval population which persists during the winter months may be inherently greater than in the autumn population. Animal rooms become progressively less utilized for breeding throughout the autumn. The part played by fuel cake in breeding this form of house-fly is somewhat obscured by some doubt as to the taxonomic identity of the flies breeding in this material; breeding, however, was most frequently observed in fuel cake during September to November.

The additional presence of human faeces undoubtedly rendered accumulations of garbage or animal excrements more suitable for breeding; provided it remained sufficiently moist, isolated human faeces could breed flies profusely.

There is a general discussion of the principles involved in attempting to reduce fly-breeding in Egypt. In practice this is not likely to be attained without some re-education of the people in organized disposal of wastes and the management of compost piles. Disposal of human faeces and garbage in specified sites remote from ponds, canals and ditches and spreading of animal excrements on the top of compost piles to encourage drying-out is indicated. Such measures, coupled with chemical treatments periodically by a village sanitarian, are likely to be effective to a useful degree. Other methods of composting should be considered. Fuel cakes might be designed and prepared in ways likely to let them dry out more quickly than at present. All these suggestions involve fundamental changes in the long-established customs of the villagers which may not be readily corrected.

D. S. Bertram

Busvine, J. R. **Forms of Insecticide-Resistance in Houseflies and Body Lice.** *Nature.* 1953, Jan. 17, v. 171, 118–19.

Resistance to DDT in house-fly strains may be accompanied by resistance to other insecticides. The author attempted to segregate the different kinds of resistance by selective breeding experiments. A non-resistant Italian strain of house-flies was crossed with a Sardinian strain which was resistant to several insecticides, and the progeny were selected for resistance to *gamma* BHC. The DDT resistance of the progeny was lower than that of the Sardinian strain, but the resistance to *gamma* BHC, chlordane and dieldrin was maintained. Selection with chlordane on an Italian DDT-resistant strain lead to a rapid increase in resistance to chlordane, while there was only a very small increase in DDT resistance. Selection with pyrethrins on the same strain gave a slight increase in resistance to this insecticide. The Sardinian resistant strain which was originally susceptible to the paralytic effect of DDT became resistant to " knock-down " after selection for this property.

Further tests with a range of insecticides on these various strains showed that resistance to *gamma* BHC and chlordane was independent of resistance to DDT. The factors for resistance to *gamma* BHC, chlordane, and dieldrin appeared to be linked. Resistance to paralysis with DDT is not necessarily connected with resistance to the lethal action of DDT. Experiments with 1, 1-dianisyl-neopentane (which cannot be dehydrochlorinated) prove that resistance to this substance is correlated with resistance to paralysis by DDT [see also this *Bulletin*, 1952, v. 49, 89].

Lice from a laboratory colony obtained from Egypt were resistant to DDT and required a median lethal dose of DDT 9 times that which was necessary to kill 50 per cent. of a British colony. These Egyptian lice, however, did not appear to be resistant to *gamma* BHC, chlordane, dieldrin, aldrin, toxaphene, allethrin or pyrethrins. It is highly probable that these lice had come into contact with DDT before they were collected to start a laboratory colony.

C. M. Harrison

Knipe, F. W. & Frings, H. **An Improved Cage for Flies.** *J. Econom. Entom.* 1952, Dec., v. 45, No. 6, 1099.

Sergent, Ed. La thimni, myiase oculo-nasale de l'homme causée par l'oestre du mouton. [**" Thimni ", Oculo-Nasal Myiasis Caused by** *Oestrus ovis*] *Arch. Inst. Pasteur d'Algérie.* 1952, Dec., v. 30, No. 4, 319–61, 7 maps & 5 figs. [Refs. in footnotes.]

The principal findings and observations of the author on oculo-nasal myiasis in man caused by the sheep nasal fly, *Oestrus ovis*, were briefly

reported in an earlier note already abstracted [this *Bulletin*, 1953, v. 50, 259]. The present paper is clearly the basis of the preliminary note. About three-quarters of this larger paper lists, and gives maps of, the known distribution in the world of human cases and also notes countries where sheep and the fly occur but not human infestations. The number of human cases for any one country is very small—frequently just one. Parasitization of man is noted for many of the countries in or adjacent to the Mediterranean basin and cases are known from the U.S.A., Mexico, Uruguay and Hawaii. A single case is reported from New Zealand, but all reports available from Australia, Argentina, the Rhodesias, South Africa, French West Africa and parts of India state that the parasite is known only from sheep.

There is an account of the clinical features and the treatment of human cases. Attention is drawn to occasional similar infestations of man by the larva of *Rhinoestrus purpureus*, normally parasitizing horses. Figures are given for differentiating the larvae of these two species; the first stage larva and adult of *O. ovis* are described and figured, that of the adult being indifferent.

D. S. Bertram

Stone, A. **The Simuliidae of Alaska (Diptera).** Reprinted from *Proc. Entom. Soc. of Washington.* 1952, Apr., v. 54, No. 2, 69–96, 1 map & 4 figs.

There are now 36 known species of Simuliidae in Alaska. A comprehensive revision of the group cannot be completed in the foreseeable future and this paper is an interim measure; it describes some new species, some hitherto unknown stages of established species, and gives where possible keys to adults and pupae of species of the genera *Gymnopais, Simulium, Prosimulium and Cnephia.* New species are given detailed textual descriptions but full illustration is withheld for the fuller revision later. The new species are: *P. travisi* (female, male and pupa), *C. emergens* (female, male only), *C. saileri* (female, male and pupa), *C. sommermanae* (female, male and pupa), and *S. gouldingi* (female, male and pupa). *S. nigricoxum* is proposed as a new name for *S. similis*. It is known only as a female.

D. S. Bertram

Dalmat, H. T. **Longevity and Further Flight Range Studies on the Black-flies (Diptera, Simuliidae), with the use of Dye Markers.** *Ann. Entom. Soc. of America.* 1952, Mar., v. 45, No. 1, 23–37, 5 figs.

This is an account of field observations on the longevity and flight range of species of *Simulium* (the anthropophilic species *S. ochraceum*, *S. callidum* and *S. metallicum*, the last being most abundant) in Guatemala.

The experiment on flight range was made in an area of about 40 sq. miles containing deep gorges and high cliffs at altitudes between 3,900 and 7,800 ft. above sea-level. Uncultivated land comprised dense forests mainly and, in cultivated districts, coffee was the chief crop with corn, bananas and sugar cane as subsidiary crops. During the work, 3·4 inches of rain fell in 7 days; average maximum and minimum temperatures were 76·5°F. and 61·7°F. respectively and relative humidities varied from 32 to 100 per cent. (mean = 62·8 per cent.); winds were slight. The survival experiment was made in another area, at a lower altitude with similar topographical features and, apart from an average humidity of 82·1 per cent., rather similar climatic conditions.

Flight range: flies were captured in the field during 74 days and, after immediate dusting with a powder of carmine and flour (carmine—1 part,

flour—9 parts) by shaking them in a test tube of this dust, they were released; 60,377 *S. metallicum*, 3,574 *S. ochraceum*, and 2,593 *S. callidum* were treated in this way. Of 52,685 flies subsequently collected at 33 catching stations over 46,000 were *S. metallicum*, of which 30 were stained flies; one stained *S. ochraceum* was also obtained out of 4,377 captured. The presence of carmine was detected by wetting the captured flies in a mixture of absolute alcohol (3 parts), glycerine (2 parts) and chloroform (1 part). The experiment showed that the flies flew at least 9·7 miles. It was difficult to have catching stations at greater distances and 9·7 miles cannot be taken as the maximum range of flight. Stained flies were taken in most directions from the point of release and as high as 2,300 ft. above it.

Survival: flies were captured, dusted with a dye (safranin bluish, safranin O, methylene blue chloride, brown thymol blue, victoria green or acid fuchsin), and recaptured flies were tested for dye with the solvent as in the first experiment. Each of the 6 dyes were used on 2 consecutive days. Thus releases of marked flies were continued for 12 days and the age of a recaptured fly, since its release, could be determined within limits of 2 days. *S. metallicum* comprised 28,490 of the 40,083 flies stained, *S. ochraceum* about 9,000 and *S. callidum* nearly 3,000. Collections of flies at 31 stations were made on 72 days beginning 3 days after the last stained fly was released. *S. metallicum* comprised 13,931 of the 23,315 flies captured and of *S. ochraceum* and *S. callidum* 7,918 and 1,466 were taken respectively; of these 54 *S. metallicum*, 29 *S. ochraceum* and 8 *S. callidum* were stained specimens. The lapse of time since their release varied from 3 to 85 days. Although this maximum figure for longevity does not include the length of life of the flies before capture or after capture, it is clear that *Simulium* adults are potentially long-lived.

Further work is envisaged to test the longevity and flight range of flies infested with *Onchocerca volvulus*. *D. S. Bertram*

Nicoli, R. M. Sur la validité du *Phlebotomus perniciosus legeri* (J. Mansion, 1913) (Nematocera Psychodidae). [**The Validity of** *Phlebotomus perniciosus legeri*] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 43–5.

Rageau, J. & Vervent, G. Clé des *Amblyomma* d'Afrique. [**Key to the** *Amblyomma* **of Africa**] *Ann. Parasit. Humaine et Comparée.* 1953, v. 28, Nos. 1/2, 60–63.

Feldman-Muhsam, B. **On the Identity of** *Rhipicephalus sanguineus* **Lat.** *Bull. Res. Counc. of Israel.* 1952, Sept., v. 2, No. 2, 187–94, 8 figs. (4 on 2 pls.) [21 refs.]

Examinations of ticks from different parts of the world have shown that *Rhipicephalus sanguineus* s.l is not 1 but 2 distinct species, namely, *R. sanguineus* s.str. and *R. secundus* n. sp.

Both species occurred in small collections from France and Algeria, but collections from other places, including the U.S.A., contained only *R. sanguineus* s.str. Illustrated descriptions are given of both ticks and in view of these findings and the fact that *R. sanguineus* s.l. is known to be a transmitter of certain diseases of man and animals, it is now necessary to re-evaluate all recorded transmission work. *H. S. Leeson*

Feldman-Muhsam, B. **A Note on East Mediterranean Species of the Genus** *Haemaphysalis*. *Bull. Res. Counc. of Israel.* 1951, Aug., v. 1, No. 3, 96–107, 10 figs.

An attempt is made in this paper to clear up the confusion which exists in the identification of certain ticks of the genus *Haemaphysalis* which have been recorded from Israel.

New taxonomic data are given for 2 species which are found on domestic stock, *H. cretica* and *H. otophila*; 2 new species are described, *H. adleri* (male and female) from the jackal and *H. erinacei* (male only) from the hedgehog; *H. punctata* is fully described for comparison though it has not so far been recorded from Israel.

Important morphological details are illustrated and keys are given to the identification of the males and the females. *H. S. Leeson*

Le Gac, P. Présence de larves d'acariens du genre *Thrombicula* sur les rongeurs du Moyen Congo (A. E. F.). [**Presence of *Trombicula* Larvae on Rodents in the Middle Congo**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 1, 45–7.

Hess, A. D. **Current Status of Insecticide Resistance in Insects of Public Health Importance.** *Amer. J. Trop. Med. & Hyg.* 1953, Mar., v. 2, No. 2, 311–17. [34 refs.]

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

Afrique Occidentale Française. Rapport sur le fonctionnement technique de l'Institut Pasteur de l'Afrique Occidentale Française en 1950 [Durieux, C.]. [**Technical Report of the Pasteur Institute in French West Africa in 1950**] 90 pp. 1952. Dakar: Grande Imprimerie Africaine.

———. Rapport sur le fonctionnement technique de l'Institut Pasteur de l'Afrique Occidentale Française en 1951 [Durieux, C.]. [**Technical Report of the Pasteur Institute in French West Africa in 1951**] 116 pp. [Refs. in footnotes.] 1953. Dakar: Grande Imprimerie Africaine.

These 2 annual reports follow the lines of their predecessors [for 1949, see this *Bulletin*, 1952, v. 49, 455]. There is the usual division into medical biology and serology, pathological anatomy, chemical analyses and sections on rabies, BCG, yellow fever, biological products, special investigations, and a short report on the Experimental Station at M'Bao.

It is noted that in 1951 there was a considerable reduction in the number of routine laboratory examinations carried out at the Institute. This is accounted for by the creation of a blood transfusion Centre for A.O.F. at Dakar early in 1951. The Centre has taken over most of the routine blood and serum examinations required locally, thus relieving the pressure of work at the Pasteur Institute. Few other changes of importance are recorded, with the notable exception of a record—for the first time for 2 years—of the occurrence of yellow fever in French West Africa. Two cases were diagnosed histologically at the Institute: both patients were Africans from Dahomey who had not been inoculated. It is pointed out that this is a reminder that jungle yellow fever has still to be reckoned with in A.O.F.

It is noted that the number of pathological examinations made was doubled in 1951 (1,372 compared with 606). There is an interesting survey by Dr. Camain on the various conditions encountered.

The following figures indicate the extent of some of the more important activities during the 2 years.

	1950	1951
Vaccines and biological products prepared	7,930,000	9,620,930
Routine laboratory examinations ..	47,915	37,883
Yellow fever vaccinations	3,867,910	4,258,995
Yellow fever protection tests	37	621
BCG vaccination of schoolchildren ..	56,057	62,096
Doses of BCG issued to territories ..	112,780	105,280
Rabies vaccine issued (ampoules) ..	35,755	44,939

The figures for anti-rabies treatment are as follows:

		Treated	*Paralytic accidents*	*Deaths from rabies*
Pasteur Institute	1950	33	0	0
	1951	28	0	0
Out-stations	1950	1017	0	6
	1951	964	0	2

The 8 deaths from rabies all occurred in Africans, and the areas from which they came were Senegal, Niger, Haute-Volta, French Guinea and Ivory Coast.

The special investigations each year cover a number of interesting matters. They have been published in medical journals and noted in this *Bulletin*. The number of publications by members of the staff of the Institute in 1950 and 1951 were 14 and 16 respectively. *H. J. O'D. Burke-Gaffney*

Coonoor. **The Pasteur Institute of Southern India, Coonoor. Annual Report of the Director, together with the Forty-Fifth Annual Report of the Central Committee of the Pasteur Institute Association 1951–52 and Scientific Report 1952.** 63 pp., 2 charts. 1953. Madras: Diocesan Press.

During the year, 242 patients received complete and 142 received incomplete courses of anti-rabic treatment at the Institute: there was only 1 death, giving a mortality rate of 0·26 per cent. At subsidiary centres, the total number who received complete or incomplete courses was 13,877 and there were 18 deaths (0·13 per cent.). All the deaths occurred in Asian patients. The usual detailed statistics are given.

General laboratory examinations amounted to 5,193.

In the Scientific section of the Report are included accounts of the work by Dr. Veeraraghavan and his colleagues on the appraisal of 5 per cent. anti-rabic vaccine (Semple), on attempts to cultivate rabies virus *in vitro*, and on the action of *V. cholerae* receptor-destroying enzyme in rabies. There is also a preliminary note on the complement-fixation test for Q fever in the Nilgiris and surrounding districts of the Madras State. In all, 188 sera from man and animals were tested and, in the screening test, 7 human, 14 cow and 2 sheep sera were positive.

A note on hetrazan as an ascaricide, by Dr. Kurian, suggests that, under the conditions recorded, this drug was not as efficient as oil of chenopodium, but it has the advantage that starvation and purgation are unnecessary.

Dr. Menon, with his colleagues, contributes epidemiological notes on influenza in different areas in Nilgiri District and elsewhere, together with laboratory studies and studies on haemagglutination.

The report of the Central Committee of the Institute is on the usual lines. [For the 1950–51 report, see this *Bulletin*, 1952, v. 49, 655.]

H. J. O'D. Burke-Gaffney

Boxus, V. & Adant, M. Les épreuves fonctionnelles du foie chez les coloniaux. Étude statistique. [**Tests of Liver Function in Europeans from the Tropics. Statistical Study**] *Ann. Soc. Belge de Méd. Trop.* 1952, Dec. 31, v. 32, No. 6, 547–68. [21 refs.]

In this statistical study, the liver function in 160 Europeans who had lived in the Belgian Congo for varying periods was compared with that of 147 controls who had not been in the tropics. Four tests were applied: blood-bilirubin, cephalin-cholesterol test (Hanger reaction), flocculation test and thymol test (MacLagan). Of the colonials 55·6 per cent. showed abnormality in one or more of these tests. These deviations in decreasing order of frequency were encountered in the thymol test, the flocculation test and the Hanger reaction. On the other hand the blood-bilirubin values of the colonials were normal. Although age had no effect on the percentage of positivity in the controls, this factor had a highly significant influence in the colonials, but duration of stay in the colony was not significant. Neither sex nor history of malaria influenced the percentage of positive tests obtained. The results with each test are discussed in great detail.

J. H. Birkinshaw

Hoeppli, R. & Wu, Ch'ing-li. **Parasitic Infections of the Human Liver of Interest to Medical Workers in China.** *Chinese Med. J.* Peking. 1952, May–June, v. 70, Nos. 5/6, 182–212, 4 figs. on 2 pls. [129 refs.]

The authors, from Peking, discuss protozoal and helminthic infections in which the liver is involved and which have been reported from or are liable to occur in China. They also discuss a single case of *Armillifer* infection of the liver reported from China [this *Bulletin*, 1928, v. 25, 290]. The paper reviews the relevant literature and includes also the authors' observations.

Amoebiasis, malaria and kala azar are discussed in relation to liver lesions, and the authors point out that only the first involves the liver in a way that the pathological changes of the organ dominate the picture.

The helminths discussed include *S. japonicum*, *Clonorchis sinensis*, *Fasciola hepatica* and other flukes. The first 2 are of great importance, but the others do not appear to have been recorded in man in China. Considerable attention is paid to invasion of the bile ducts by adult *Ascaris*: the authors report 69 cases from China, most of them reported within the last 10 years. Twenty-two separate records are discussed.

The paper is a valuable compendium for those wishing to seek information on parasitic infections of the liver in China. It contains 129 references, a large proportion being from Chinese journals.

H. J. O'D. Burke-Gaffney

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